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A METHOD OF EVALUATING CORRECTIONS IN THE CASE OF QUICK TARGETS.

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BY

LIEUT.-COLONEL J. R. J. JOCELYN, R.A.

An important, if not the only function of many forts in war, will be the prevention of swift vessels running past them. Corrections for travel of target, often further complicated by considerations of tide, will then be of great moment, and must be quickly evaluated and applied; and, as guns will be laid over the sights, whenever possible, their responsibility will rest, entirely, on the officer controlling the fire.

The method of determining corrections for travel, by drums or tables, based upon a "change of range," is simple and expeditious, and in certain cases is capable of easy application, but it is open to question if it could be made use of, against a very rapid objective steaming straight on to a fort, or nearly so. Then, ranges would change very rapidly, corrections would have to be made again and again, an officer would not only have to estimate the error of his last shot, but would have to consider how corrections would be modified by the then position of the target. At night "snap shooting" might have to be used, the enemy being only visible at intervals, and at any time, smoke, either from the fort or the ship, might prevent observation of fire, which would be liable to further interference, from the difficulty of identifying projectiles, if several works were simultaneously in action. In certain waters, also, new complications would be impressed upon all the foregoing, if tides were variable and sites were low.

To cope with these difficulties, not only great natural quickness appears necessary, but considerable practice is also desirable, which, unfortunately, is difficult or impossible to get, owing to safety considerations and the present pace of towing.

Moreover, it is probable that ammunition, if properly sorted and gauged by trial shots, can be trusted; that guns shoot even more accurately than the range tables affirm; that errors in racers and other gear can be detected and allowed for; that, after a little training, few mistakes are made in loading, or in giving elevation and group difference; that reliable layers are forthcoming; and that, in general terms, the success of the shooting depends upon the officer controlling the fire and his range-finding instruments and detachment.

Now, it is in the defence of channels, straight or nearly so, that the difficulties of correction, above referred to, approach the acute stage; the following method is an attempt to turn these very conditions to account, so that *corrections may be laid down beforehand and applied, after the manner of a group difference.*

Let G be a gun, commanding a channel, whose general direction is FF'; let P be a distant point in FF' and let GAP be a right angle: then the range of a ship, steaming from P to A, would gradually diminish, until it reached its smallest value, at A. If the speed of the

FIG. 1.

ship and the distance GA be known, corrections for range, for all points of the ship's course, can be laid down beforehand for any given conditions of firing.

Let v be the velocity of the ship, in yards per second, let t be the time, in seconds, made up of the "time of firing" of a certain fort, and the time of flight, due to any range GP, when using a certain gun; also let k, measured in yards, be the range correction for travel, at P, under these conditions.

Then
$$k = t \times v \cos GPA, \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$
$$= tv \times \frac{PA}{GP};$$

now if GP be drawn to a scale of "equivalent times,"[1] t will vary directly as GP,

hence $k = Mv \times PA$, where M is a constant.

[1] *See* Table I.

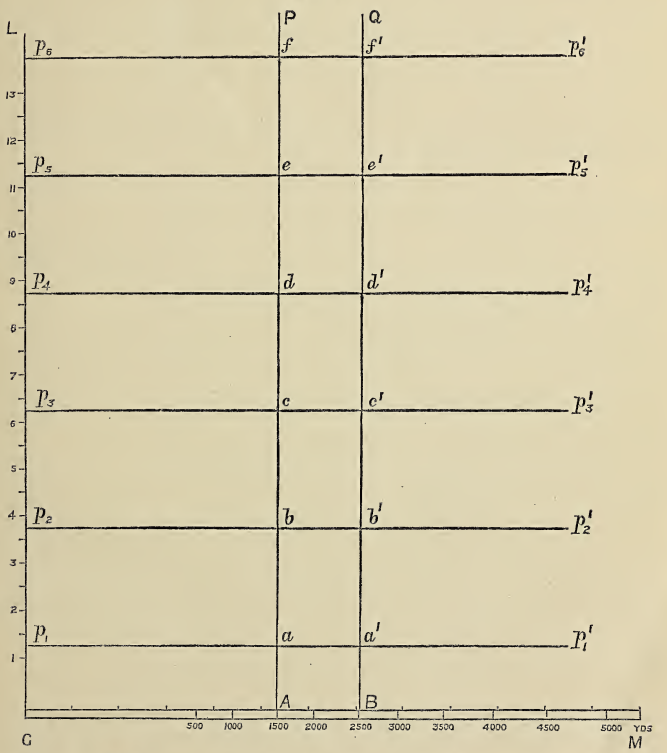
We see, therefore, that for objectives, moving at the same rate, and in the same general direction, the correction k is constant, for all positions along a line through P, parallel to GA. Thus, if we draw GQ parallel to FF', and $Q\,P\,Q'$ parallel to GA, then whether the ship be at Q, P or Q', the correction k will be the same, so long as the velocity and the direction of motion remain unaltered.

By making use of this property we can evaluate the range correction for any point of a channel, by a simple graphic method.

To make this clear, let us consider the case of the 10-inch B.L. gun, with a time of firing of three seconds and an objective of 20 knots, ($v = 10$).

Let G be the position of the gun and let GL be drawn parallel, and *Vide* Fig. 2. GM perpendicular to, the general direction of the channel. Divide

FIG 2.



GL and GM into scales of equal parts, to read seconds and fractions

of seconds. Beneath GM place a scale of equivalent ranges; these can be easily obtained by the use of the range table of the gun, as follows:—

TABLE I.

Range.	Time of Flight.	Time of Firing.	Equivalent Time.
500	·84	3	3·84
1000	1·54	3	4·54
1500	2·36	3	5·36
2000	3·2	3	6·2
2500	4·07	3	7·07
3000	5	3	8
3500	5·96	3	8·96
4000	6·98	3	9·98
4500	8·14	3	11·14
5000	9·34	3	12·34

Now, in the particular case of an objective steaming down the line LG, equation (1) would take the form,

$$k = v \quad t \qquad \ldots\ldots(2)$$

and if the speed be 20 knots (viz., 10 yards per second)

$$k = 10\ t$$

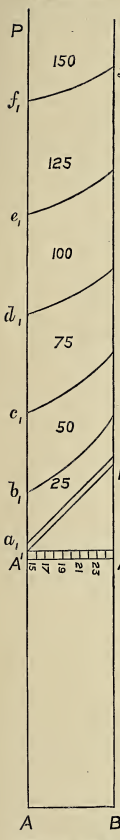
Then, if we give to k the successive values of $12\frac{1}{2}$, $37\frac{1}{2}$, $62\frac{1}{2}$, $87\frac{1}{2}$, $112\frac{1}{2}$, &c., we can at once write down the corresponding values of t, which are, of course, 1·25, 3·75, 6·25, 8·75, 11·25, &c.

Next, mark off these values along GL by the successive points, p_1, p_2, p_3, p_4, p_5, &c., then we see that when the objective is between G and p_1 no correction is necessary; between p_1 and p_2 25 yards is the correction; between p_2 and p_3, 50 yards; between p_3 and p_4, 75 yards; between p_4 and p_5, 100 yards, &c. The equivalent ranges of these points can be determined from the scale of yards below GM.

Now, suppose the same objective to be moving parallel to LG, along the line PA, whose perpendicular distance from it is 1500 yards; then if A be the point of minimum range, its position in GM can at once be determined, for, as we see in Table I., 1500 yards corresponds to 5·36 seconds, and PA can be drawn as shown. Through the points p_1, p_2, p_3, &c., draw the lines p_1p_1', p_2p_2', &c., parallel to GM, and cutting PA, in the points a, b, c, &c., then, as we saw above, there will be no correction between A and a; 25 yards between a and b; 50 between b and c; 75 between c and d; 100 between d and e, etc. If, now, a compass be pivoted at G, the distances Ga, Gb, Gc, Gd, etc., can be read off, along the yard scale on GM, and registered.

Next, suppose the gun to command a certain channel, which is bounded by lines, whose perpendicular distances from G are 1500 yards and 2500 yards respectively. Then PA will represent the nearer boundary. From G, along GM, set off GB, equal to 7·07 seconds,

Fig. 3.



which, as is seen in Table I., corresponds to a range of 2500 yards. Through B, draw $B\,Q$, parallel to $P\,A$, then $B\,Q$ will represent the further boundary. Let the lines $p_1\,p_1'$, $p_2\,p_2'$, etc. cut $B\,Q$ in the points a', b', etc., then the channel will be divided into compartments, each corresponding to a certain range correction.

It is, however, convenient to exhibit this information in another form. Draw $A\,P$ and $B\,Q$, as before (*see* Fig. 3) ; measure off, on Fig. 2, the distances $G\,A$, Ga, Gb, Gc, etc., and lay them off vertically, form A, in Fig. 3, so that the points A', a_1, b_1, c_1, etc., are obtained. In a similar way, lay off on $B\,Q$, the proper distances from G, so that the points B', a_1', b_1', c_1', etc., are obtained also. Then if intermediate points are treated in like manner, the lines aa', bb', cc', etc., of Fig. 2, will become transformed into the curves[1] $a_1\,a_1'$, $b_1\,b_1'$, $c_1\,c_1'$, etc., of Fig. 3. Transfer the horizontal scale of yards, between $A\,B$ in Fig. 2, to $A'\,A'$, in Fig. 3 ; then the part of the figure below the last named line is no longer needed, and the correction, due to any range, can at once be seen, if a scale of yards, similar to that along $G\,M$, Fig. 2, be applied to $A'P$, $A'Q$, or any intermediate parallel line : the zero of the scale being on the line $A'\,A'$.

Now, it is suggested that in a channel, straight or nearly so, where variations of tide can be neglected, this method may be found useful. Local circumstances would determine the limits, such as $A\,P$ and $B\,Q$, in fig. 2, as also the useful values of v. Figures, similar to Fig. 3, might be constructed for each of these values, and disposed in a row of contiguous columns, each marked with its own velocity ; they then might be placed round the surface of a drum, rotating in a suitable cylinder, so that, through a slit in the latter, any desired column could be brought to view. On the outside cylinder a scale, reading ranges from G, should be placed vertically along the edge of the slit, which would show through what limits the various corrections held good. It would be constructed on the same principle as that below $G\,M$, in fig. 2.

Thus Fig. 4 is a portion of the information, placed round a drum, constructed for forts commanding a channel, where the minimum range of an objective might vary from 800 to 2000 yards, the guns being 9-inch, 10-inch, or 12·5-inch R.M.L., with an average "time of firing" of three seconds.

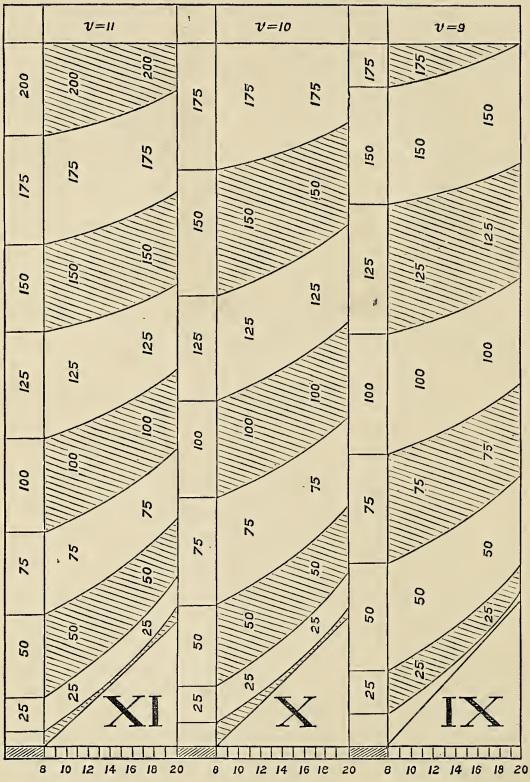
Figure 5 gives a view of the outside cylinder when set for a ship steaming 22 knots ($v = 11$) along a line, that would give a minimum range of 1200 yards.

---

[1] These curves are rectangular hyperbolæ; their equation is of the form $k = v't$, where v' is the variable value of the speed, resolved along any line $P\,G$, Fig. 1.

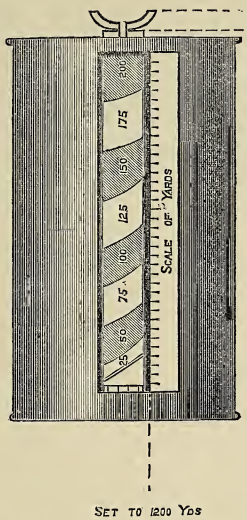
In order to use a drum of this kind, it is necessary to know the velocity of the ship and the minimum value of her range on her present course, *i.e.*, the distance $G A$, of Fig. 1.

Fig. 4.



If the speed is not known, it can be very fairly determined as follows, and, as the telescope of the range-finding instrument can generally bear on a target before any gun can, time need not be sacrificed. Thus, suppose the ship to first come into the field of the telescope at P (Fig. 1), let her be carefully followed, and let the time, in which the range changes by 100 yards, be taken once or twice. As the angle $G P A$ can never, in the supposed case, exceed 15° or so, the velocity estimated

Fig. 5.



along the line GP will differ but slightly from the true speed, and may be taken as such, as shown in the following table :—

TABLE II.

Value of v.	Time for range to change by 100 yds.	Value of v.	Time for range to change by 100 yds.
14	6·9″ to 7·4″	10	9·5″ to 10·5″
13	7·4″ to 8″	9	10·5″ to 11·7″
12	8″ to 8·7″	8	11·7″ to 13·3″
11	8·7″ to 9·5″	7	13·3″ to 15·4″

It is convenient to have a copy of this table on the outside cylinder.

In many cases the distance GA will not vary considerably from the perpendicular distance to the "fairway," as marked on the Admiralty charts, and if there is no means of determining the exact point the ship is making for, this value might, in the first instance, be selected : small inaccuracies in evaluating GA are of no great moment when the ship is at a distance, as is shown by the appearance of the line $f_1 f_1'$, as compared with $a_1 a_1'$, in Fig. 3, and as she approaches, the eye is able to determine, the part of the channel, she is in.

If the position-finder is properly installed, with a chart beneath it, or if certain modifications, proposed for the depression range-finder, are adopted, the distance of GA (Fig. 1) can be obtained, with much accuracy, by either instrument ; in many cases, however, a good knowledge of the water way will render this unnecessary.

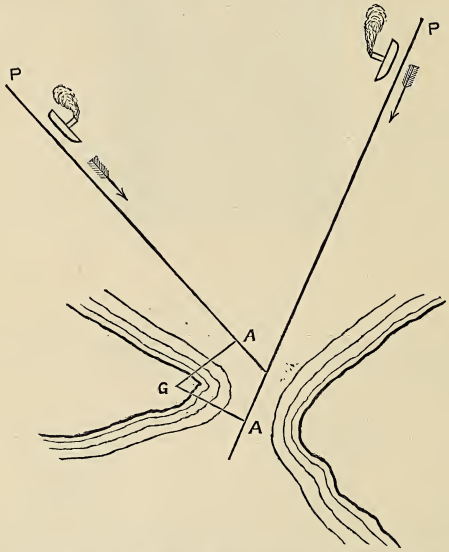
The drum is set as follows : when GA and v are known, the inner cylinder is turned until the column marked with the proper value of v

comes into view, and further, until the proper point on the horizontal scale[1] under the column is made to abut against the vertical scale on the outside cylinder. This proper point is, of course, that, corresponding to the value of GA (*see* Fig. 5). When set, the drum can be clamped.

Again, suppose the fort to be at the mouth of a channel leading into the open sea, the method will still hold good as long as the ship employs a straight run in, and there is an obligatory point of passage.

For if Fig. 6 represent a supposed case, the value of GA can only

FIG. 6.



vary within small limits; thus, the triangle GAP may be supposed to have a sort of movement of rotation about G, so that while GA does not alter materially, the point P may have a large arc of travel.

In general, it may be claimed that the method is applicable as long as the distance GA can be approximately fixed, but the triangle GPA may be anywhere in the horizontal plane.

Now, when the conditions on which the method depend disappear, the necessity for extreme rapidity in evaluating corrections disappears also; when they exist, an officer need only ask from his range-finding detachment one operation, which can generally be gone through before the guns can bear, even if it is not rendered unnecessary by local knowledge of tides and speeds, or expert naval information; and, once having set and clamped his drum when any range is called or exhibited,

[1] *e.g.*, the scale $A'A'$ of Fig. 3.

TABLE III.

TABLE OF ANGLES OF ARRIVAL,[1] SHOWING CORRECTIONS FOR TIDE.

Correction in yards.	$r = 1'$	$r = 2'$	$r = 3'$	$r = 4'$	$r = 5'$	$r = 6'$	$r = 7'$	$r = 8'$	$r = 9'$	$r = 10'$
0	Above 1° 32′	Above 3° 57′	Above 4° 27′	Above 6° 5′	Above 7° 32′	Above 9° 5′	Above 10° 25′	Above 12° 57′	Above 13° 20′	Above 14° 55′
25	1° 32′ to 31′	3° 57′ to 1°	4° 27′ to 1° 32′	6° 5′ to 2° 2′	7° 32′ to 2° 20′	9° 5′ to 3° 7′	10° 25′ to 3° 26′	12° 57′ to 4° 26′	13° 20′ to 4° 27′	14° 55′ to 5° 55′
50	31′ " 18′	1° " 39′	1° 32′ " 55′	2° 2′ " 1° 13′	2° 20′ " 1° 32′	3° 7′ " 1° 50′	3° 26′ " 2° 8′	4° 26′ " 2° 26′	4° 27′ " 2° 45′	5° 55′ " 3° 57′
75	18′ " 13′	39′ " 26′	55′ " 39′	1° 13′ " 52′	1° 32′ " 1° 5′	1° 50′ " 1° 19′	2° 8′ " 1° 32′	2° 26′ " 1° 45′	2° 45′ " 1° 58′	3° 57′ " 2° 16′
100	13′ " 10′	26′ " 20′	39′ " 31′	52′ " 41′	1° 5′ " 51′	1° 19′ " 1° 1′	1° 32′ " 1° 11′	1° 45′ " 1° 21′	1° 58′ " 1° 32′	2° 16′ " 1° 42′
125	10′ " 8′	20′ " 17′	31′ " 25′	41′ " 33′	51′ " 42′	1° 1′ " 50′	1° 11′ " 58′	1° 21′ " 1° 7′	1° 32′ " 1° 15′	1° 42′ " 1° 23′
150	8′ " 7′	17′ " 14′	25′ " 21′	33′ " 28′	42′ " 35′	50′ " 42′	58′ " 49′	1° 7′ " 56′	1° 15′ " 1° 3′	1° 23′ " 1° 10′
175	7′ " 6′	14′ " 12′	21′ " 18′	28′ " 24′	35′ " 31′	42′ " 37′	49′ " 43′	56′ " 49′	1° 3′ " 55′	1° 10′ " 1° 1′
200	6′ " 5′	12′ " 11′	18′ " 16′	24′ " 22′	31′ " 27′	37′ " 32′	43′ " 38′	49′ " 43′	55′ " 49′	1° 1′ " 54′
225	5′ " 5′	11′ " 9′	16′ " 14′	22′ " 19′	27′ " 24′	32′ " 29′	38′ " 34′	43′ " 38′	49′ " 43′	54′ " 48′
250	5′ " 4′	9′ " 9′	14′ " 13′	19′ " 17′	24′ " 22′	29′ " 26′	34′ " 31′	38′ " 36′	43′ " 39′	48′ " 44′
275	4′ " 4′	9′ " 8′	13′ " 12′	17′ " 16′	22′ " 20′	26′ " 24′	31′ " 28′	36′ " 32′	39′ " 36′	44′ " 40′
300	4′ " —	8′ " 7′	12′ " 11′	16′ " 15′	20′ " 18′	24′ " 22′	28′ " 26′	32′ " 29′	36′ " 33′	40′ " 37′

[1] The angle of arrival is the sum of the angle of descent due to the trajectory, as given in the Range Tables, and the angle of depression due to the site.

NOTE.—r = difference in feet of height of tide from mean.

the corresponding correction is under his eye without any further

TABLE XV.

EFFECT OF TIDE ON 10-INCH B.L. GUN 25 FEET ABOVE MEAN TIDE.

Rise or fall in feet (*r.*)	± 1	± 2	± 3	± 4	± 5	± 6	± 7	± 8	± 9	± 10
	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.	Yards.
0	Over 1600	Over 3700	Over 4100	Over 4900	Over 2500	Over 3250	Over 3450	Over 4050	Over 4100	Over 4950
25	1600— 800	3700— 800	4100—1600	4900—2300	2500—1000	3250—2100	3450—2400	4050—2700	4100—3000	4950—3700
50	—	—	1600— 800	2300—1000	1600— 800	2100—1200	2400—1600	2700—1950	3000—2200	3700—2450
75	—	—	—	1000— 800	—	1200— 800	1600— 950	1950—1300	2200—1600	2450—1900
100	—	—	—	—	—	—	950— 800	1300— 800	1600—1100	1900—1350
125	—	—	—	—	—	—	—	—	1100— 800	1350— 900
150	—	—	—	—	—	—	—	—	—	900— 800
175	—	—	—	—	—	—	—	—	—	—
200	—	—	—	—	—	—	—	—	—	—

Correction in yards + or —

trouble, subject always to the proviso that tide may be neglected.[1]

[1] Powder correction is a fairly constant quantity.

Fortunately, in many cases, guns are placed high enough to be uninfluenced by tide to any great extent. Table III. has been compiled in order that it may be seen at a glance when a correction is necessary. When guns are fired with quadrant elevation, the angles of arrival should always be entered in the range table; these angles being obtained by taking the sum of the angle of depression, due to the site, and the angle of descent, due to the trajectory; when these are to hand, and the rise and fall of tide, r, is known, the table will at once give the necessary information. Thus, for example, let the tide be 9 feet above mean, and, at a certain range and with a certain gun, let the angle of arrival be 1° 20′, that is between 1° 32′ and 1° 15′, we see at once, from the table, that the correction must be 125 yards, and as the tide is high it is a *plus* correction.

Table III. also shows that at times this correction may be of great importance, as in the example given in Table IV.

The difficulty of tide can be got over by using tangent elevation, or having some sort of adjustable reader: the first is, of course, impossible with the position-finder, and, at other times, would entail the loss of the many advantages of straight-edged sights and sighting steps; the second would appear feasible, but a satisfactory method is not forthcoming. If, then, we have to compete with a variable tide and a quick objective, we are face to face with a difficult problem, which cannot be solved by what is called the "the light of nature": and any labour which can be carried out at leisure, which will help to its speedy solution at the critical time, cannot but be well spent.

For a given velocity and a given height of tide, tables of corrections can be easily constructed, supposing the channel to be not very wide; if the width exceeded 300 or 400 yards the tables would have to be made out for several values of GA (Fig. 1), say, for each 300 yards of difference. For example, suppose GA capable of variation, between 800 and 2000 yards, tables for $GA = 1100$, $GA = 1400$, and $GA = 1700$ would suffice. The information concerning each velocity might be placed on a card, or on a drum, so constructed that only the information needed would be visible. The drums or cards should be kept, properly arranged, at the fighting station of the fort.

To show the form the information might be placed in, let the gun of Table IV. command a channel, the fairway of which is at a perpendicular distance of 1000 yards ($GA = 1000$), and let us suppose an objective of 24 knots ($v = 12$): then, by the graphic method already described, we find the following corrections to hold good :—

TABLE V.

Range.	Correction.
5400—4950	−150
4950—4200	−125
4200—3250	−100
3250—2400	− 75
2400—1600	− 50
1600—1100	− 25
1100—1000	− 0

If, now, we correct these by Table IV. for differences from mean tide of 9 feet and 10 feet we get the following results :—

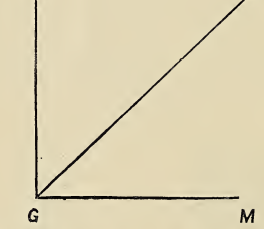
TABLE VI.

LOW TIDE.				HIGH TIDE.			
$r = 10'$ or height of gun 35′.		$r = 9'$ or height of gun 34′.		$r = 10'$ or height of gun 14 feet.		$r = 9'$ or height of gun 15 feet.	
Range.	Correction	Range.	Correction	Range.	Correction	Range.	Correction
5400—4200	— 175	5400—4950	— 175	5400—4950	— 125	5400—4900	— 125
4200—3700	— 150	4950—4200	— 150	4950—4200	— 75	4900—4200	— 100
3700—3200	— 175	4200—4100	— 125	4200—3700	— 50	4200—4100	— 75
3200—1800	— 150	4100—3200	— 150	3700—3200	— 25	4100—3200	— 50
1800—1600	— 175	3200—3000	— 125	3200—2400	0	3200—3000	— 25
1600—1300	— 150	3000—2400	— 150	2400—1800	+ 50	3000—2400	0
1300—1000	— 175	2400—2200	— 125	1800—1600	+ 75	2400—2200	+ 25
—	—	2200—1100	— 150	1600—1300	+ 100	2200—1600	+ 50
—	—	1100—1000	— 175	1300—1000	+ 125	1600—1100	+ 100
—	—	—	—	—	—	1100—1000	+ 125

This table shows that the range corrections become somewhat complicated under certain conditions. It can, however, only be determined locally how far information of the above kind can be made use of, and the most convenient form it should take.

Sometimes it may be worth while to predict deflection, it can be done in the following way.

Fig. 7.



Thus, as before, let G be a gun, and let GL be parallel, and GM perpendicular to, the general direction of a channel, and let P be the position of a ship, moving at speed v; then, as the latter is supposed

to be moving parallel to GL, its angular velocity with respect to G is, in circular measure,

$$\frac{v \cos PGM}{GP}$$

which, in degree measure is,

$$\frac{180}{\pi} \times \frac{60\, v \cos PGM}{GP} \text{ minutes,}$$

or $$\frac{3420\, v \cos PGM}{GP} \text{ approximately.}$$

Now, if R be the range in yards, and t' the time of flight in seconds, when using Case II., or the time of flight *plus* some constant, when using Case I., and D the correct deflection in minutes for any given position of P, then,

$$D = 3420\, v \cos PGM \times \frac{t'}{R} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

If, now, we take any unit of deflection, say 15′, we can, from equations similar to (3), determine through what limits any given value of D will hold good.

For example, we might give D the successive values of $7\frac{1}{2}'$, $22\frac{1}{2}'$, $37\frac{1}{2}'$, $42\frac{1}{2}'$, etc., and in each case determine the value of the angle PGM, for the requisite values of v. The factor $\frac{R}{t'}$ can, of course, be obtained from the range table and the conditions of firing; thus, with the 9-inch R.M.L. and Case II., it will be found to vary from 350 to 450 as the range changes from 5000 to 900 yards.

In this way Table VII has been compiled.

The graphic method can then be applied.

Divide GL and GM into scales of equal parts, to read yards (Fig. 7) and, as an example, let $v = 8$. Draw quadrants of radii 1000, 2000, 3000, etc., and mark off on them the angular limits as given in the table; join the points so found, and the water-way is divided into regions over which certain deflections hold good. Draw AP and BQ to represent a channel, whose perpendicular distance from the gun varies from 800 to 2000, say; we see, in the figure, it is divided into strips, in the same way as the channel of Fig. 3. Then, proceeding as in the case of Fig. 3 and Fig. 4, the deflection information can be set forth for each velocity in contiguous columns, to which vertical scales reading ranges can be applied. The scale employed is that on GL or GM (fig. 8).

Fig. 9 is a portion of the information placed round a drum, constructed for forts commanding a channel, when the minimum range of an objective might vary from 800 to 2000 yards. When a channel is not very wide, and four or five velocities are considered sufficient, columns of corrections for range and deflection can be disposed round the same drum, and arranged so that when the latter is clamped the two sets of corrections are simultaneously visible, at two slits or openings, on opposite sides of the cylinder.

Certain channels lend themselves to the selection of points or spots for concentration of fire on torpedo boats or fast cruisers; the above

TABLE VII.

SHOWING VALUES OF ANGLE *P G M*, FIG. 7, FOR THE 9-INCH R.M.L., CASE II.

	$v = 11$.					$v = 10$.					$v = 9$.					$v = 8$.				
Ranges.	5000	4000	3000	2000	1000	5000	4000	3000	2000	1000	5000	4000	3000	2000	1000	6000	4000	3000	2000	1000
Deflection	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
7·5″	86	85¾	85¼	85	84¼	85½	85¼	85	84¾	°	85	84¾	84½	84¼	84	84½	84¼	83¾	83½	83
22·5″	77½	77	76	74	73	77	76	75	74	73½	75	74	73½	72	71	73½	72	71	70	68
37·5″	68½	69	66	64	61	67	65½	65	62½	61½	64½	62½	61½	59½	57	61	59½	57½	55	52
52·5″	60½	59	54	52	47	57	55	53	49½	48½	52½	50½	49	44	40	47	44	41½	36	31
67·5″	50	48	41	36	29	45	42½	40	34	31	38	35	31	24	12	29	23	15	—	—
82·5″	38	35	24	12	—	31	25½	19	—	—	17	—	—	—	—	—	—	—	—	—
97·5″	23	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

methods give an easy way of arriving at the requisite corrections, and laying them down beforehand.

Fig. 8.

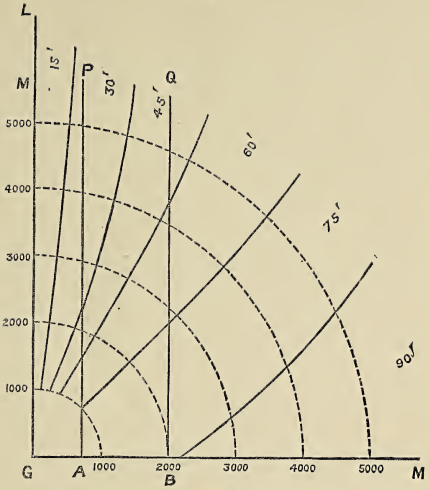
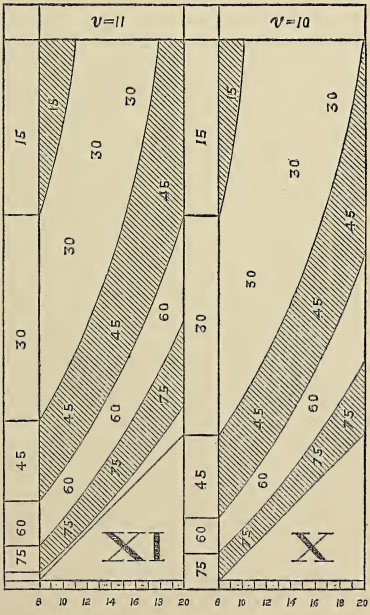

L
M
P
Q
15'
30'
45'
60'
75'
90'
5000
4000
3000
2000
1000
G
A
B
1000
2000
3000
4000
5000
M

Fig. 9.


V=11
V=10
15
30
45
60
75
XI
X
8 10 12 14 16 18 20

HINTS ON REPLACEMENT OF CASUALTIES.

BY

MAJOR E. C. HAWKSHAW, R.A.

As the putting together of a disorganised team is a matter somewhat lightly dealt with in books on our Artillery, I venture to submit a few practical hints for any mishap which may occur to a gun or wagon team in action, rendering a C.O. independent of spare horses.

(1.) *Off Leader Disabled.*—Unhook and cast him loose, and go on with five horses.

(2.) *Near Leader Disabled.*—Unhook and cast him loose. Let the driver mount the off horse without stirrups, putting his disabled horse's driving rein on. Team goes with five horses.

(3.) *Off Centre Horse Disabled.*—Unhook and cast him loose, bring the off leader back into his place, and go on with five horses, as in case (1).

(4.) *Near Centre Horse Disabled.*—Unhook and cast him loose, put near leader into disabled horse's place, mount lead driver on off leader and go with five horses as in case (2).

(5). *Both Lead Horses Disabled.*—Unhook and cast loose, and go on with team of four horses.

(6.) *Both Centre Horses Disabled.*—Unhook, cast loose and hook-in leaders in their places, and go on with team of four.

(7.) *Off Wheel Horse Disabled.*—Unhook and cast loose. Put near wheeler into the shafts (shifting the shafts from double to single draft is quite unnecessary), take a drag-rope, pass it over the saddle (a blanket underneath the rope prevents the saddle being scratched), make one end fast round the off shaft where a tug would rest, take a knot round for the other tug on near shaft, then pass it underneath and make a belly-band of it, fastening to the off shaft again.

Now for the breeching: Fasten off side as usual, undo the small strap of the near side from the breeching buckle and pass the iron loop on the shaft, to which the breeching is usually fastened, through the breeching buckle, and put the tongue of the buckle through the iron loop. Here you have a ready and admirable breeching.

Wheel traces hook as usual.

Hook-in off centre horse's two traces to the wheel horse's off side, and the near centre horse's two traces to the wheel horse's near side.

Put the wheel driver up on the shaft horse.

(8.) *Riding Wheeler Disabled.*—Unhook and cast loose disabled horse. Fasten centre horses to shaft horse as described in case (7). The pad is a rough seat for a driver to ride without stirrups, but if great hurry is required he must put up with it, putting his disabled horse's driving rein on his new mount. If there is no particular hurry he can make up some reins with the leading and driving reins and sit on the limber to drive from.

(9.) *Both Wheel Horses Disabled.*—Unhook and cast loose disabled horses. Back centre horses into their places. Make back and belly-band for shaft horse as in case (7). For breeching take another drag-rope, fasten one end round the off shaft in front of the iron breeching loops, pass the rope under the horse's croup, and fasten it round the near shaft in front of breeching loops. For this we are indebted to Colonel Gambier, R.A. Fasten the traces of both new wheelers round the splinter bar.

(10.) *Off Shaft Broken—To drive curricle.*—Colonel Gambier also instituted the following arrangement: Take head-rope or head-collar chain, fasten to ring on off hame of near horse, take turn round near shaft where tug would rest, pass the rope over the off horse's saddle, and fasten it to ring on off hame. Do the same with another head-rope or head-collar chain, beginning with ring on near hame of off horse. This forms admirable draft and safe.

(11.) *Near Shaft Broken.*—Take the horses out. Put off shaft into place when shifted "from double to single draft." Hook a swingle-tree on to end loop of splinter bar on off side.

Hook your horses in as in case (10).

(12.) *A Driver Disabled.*—If no one is available to take his place, put the two drivers on the lead and wheel horses. The centre horses will, as a rule, be amenable by themselves.

I may add that I stop in the middle of battery parades nearly always, give one of these cases, and go on drilling with the teams improvised. All my centre horses are constantly sent to drill-order and driving-drill as wheelers, and have to undergo riding as well as shaft work. This ensures little trouble in getting them into any place required, and accustoms them to being suddenly called upon to do things out of the ordinary groove.

A ready method of making a driving-rein, in any case where the off horse has to be ridden, is this:—Unbuckle the buckle on the leading-rein and run the buckle up the rein to within about eight inches of the end of the loop, then make a thumb knot with the rein, tight up against the buckle, throw the rein over the horse's head and there you have an excellent driving-rein.

To do this takes 30 seconds at the outside.

ENTRAINING ELEPHANTS AT JHANSI.

BY

MAJOR J. H. ROSSETER, R.A.

In the "Proceedings" of the R.A. Institution for January, 1893, extracts were published from the "Instructions for the Conveyance by Rail of Artillery in India," and tables showing the composition of the various trains were given. It may be remembered that the first of the four trains allotted for the conveyance of a Heavy Field Battery was composed principally of elephant trucks. A short account of entraining elephants in a truck designed and fitted by the Indian Midland Railway at Jhansi may, perhaps, interest some Artillery officers.

Description of Truck.

A strong cage was made in the centre of an open low-sided goods truck. The framework of this cage was of rails similar to those used for the permanent way; the uprights were bent up at the bottom and securely bolted to the sides of the truck. Two cross-pieces sliding along the lower bar were clamped close to the chest and hind-quarters of the elephant when in the truck, and a hood with side shutters prevented the animal seeing passing objects when on the move.

The whole of the fittings were very strong, and their great advantage was that the elephant, being fixed in the centre of the truck and having only a few inches to move in any way, could not sway about and thereby endanger the stability of the truck.

Entraining the Elephants.

The first elephant to be enticed into the cage was one which has completed 24 years' service, has marched thousands of miles with the battery, and was harnessed to one of Major Tillard's[1] guns which he brought into action at Ahmed Khel. This sagacious creature walked straight into the truck.

All the 18 elephants of the battery were successfully entrained by Captain A. H. Block, R.A. Some of them gave a considerable amount of trouble; one fought and resisted for upwards of two hours, and finally had to be forced into the truck backwards.

The method adopted was as follows, and was very nearly the same

[1] Now Major-General Tillard. *Vide* "Achievements of Field Artillery," by Major E. S. May, R.A., in "Proceedings" R.A.I., February, 1893.

as that recommended by the late Colonel P. Sanderson, Superintendent of Kheddahs, Mysore :—

Four ropes were used, one for each foot. One end of each of these ropes was laid on the platform near the truck door, the other ends were passed through eye-bolts in the truck floor and through holes at the ends of the truck, the two ropes for the fore feet to the front, and those for the hind feet to the rear end of the truck, the ends of the ropes being passed round the buffers.

The elephant having been brought up as near to the truck door as possible, the ropes were secured to the feet. With a stick or spear, if necessary, the animal was made to move each foot in turn a few inches at a time, and the slack on the rope was taken in. As soon as the elephant was in the cage the bars were put up at the entrance, the feet lashed together with a figure-of-eight lashing, and the cross-bars clamped close to the chest and hind-quarters.

The first entrainment of the elephants took between seven and eight hours, while the second was completed in one hour and 40 minutes.

The truck was attached to an engine and moved up and down the line several times, and no damage of any sort either to elephants or truck occurred.

MEMOIRS

HISTORICAL AND BIOGRAPHICAL.

THE BROME-WALTON FAMILY.

BY

MAJOR AND QUARTERMASTER R. H. MURDOCH, R.A.

(Assistant-Superintendent of Records).

(Continued from No. 9, Vol. XX., p. 486).

Chapter IV.

First American War.

. . . *tam in mari quam in terra.*	Marcus Graecus, *cir* 1000.
. . . *per Mare, per Terram.*	Royal Warrant, 1827.

"The *Third Silesian War*—since called *Seven Years' War*, that proving to be the length of it—is now near. Breaks out, has to break out, August 1756. The heaviest and direst struggle Friedrich ever had: the greatest of all his Prowesses, Achievements, and Endurances in this world."[1]

Austria, Russia, France, Sweden, and the German Empire, arrayed against little Prussia and her only Ally, England! A war which cost Europe one million lives, and exhausted all the States embarked in it, without having procured to any but England the smallest substantial advantage. Behold the *hour:* the *man*, of Prussia, was the Great Frederick—who emerged covered with glory, with Prussia as a first-class Power. *England* came out of it as the *Great* Britain, with the seal set to her maritime and commercial supremacy in the four quarters of the globe: but who was the *man* of England? Need it be said: that man was the immortal Pitt, whose name must ever be identified with the consolidation of our national greatness.

The student of official history enters this period with the consciousness of a new spirit pervading the musty folios. Hitherto England had been equal to only one Expedition at a time; all the energies of the nation were concentrated upon that undertaking; and the official

[1] Carlyle's "Frederick the Great," p. 313.

student need focus his researches only upon a few scattered volumes and pages upon one topic. But, now, the stream of artillery history flows through as many widely diverging channels as there are quarters of the globe:—for *Asia*, trains and companies to the East Indies; artillery expeditions to *Africa*[1]; outbreak of war in *America* and the West Indies; and, in *Europe*, armaments and equipments for both sea and land services, bomb-ships, tenders, and land trains to operate against the harbours and coast fortresses of France; and a *corps d'armée* to co-operate with Prussia in Germany and central Europe.[2]

Who is sufficient for these things?

A compendious history of the Royal Artillery should also narrate the births of the children who have successively sprung from the sides of this venerable regimental *Brahma*:—the Ordnance Store Corps, Commissariat, and Accompt Departments of Henry III; the Royal Marine Artillery, of 1804; and, from the days of Henry VII. down to 19th century, the Royal Artillery commanders and gunners on ships of war, concerning whom even Naval History is significantly silent.

Fortunately, the author of the present pages is not writing a history of the regiment, but memoirs of a particular family of distinguished gunners; yet we have seen how the first two members of the *Brome-Walton* family could not be introduced upon the theatres of the wars of the *Spanish* and *Austrian Successions* without necessitating the "cutting of an artillery road through the tangled jungle of impersonal history:"[3] even so, the third gunner of this amphibious house, Lieut. *Joseph Walton*,[4] may not undergo his baptism of fire, "on the Bombs," without evoking enquiry as to the origin, armament, and command of these floating batteries termed "Bomb-Ships," &c., of which we can learn absolutely nothing from the pages of either military or naval history. The present chapter, however, must be confined to the operations, by land and sea, arising out of the rivalries of England and France for supremacy in *America*, which presently led to the declaration of war in Europe.

The *Seven Years' War* broke out in Germany in August 1756, on the initiative of Prussia; but, since the year 1755, England had already set the balls rolling in America,[5]—to resist the prescient harbour-loving encroachments in America of our Gallic neighbours—over the boundary question of Nova Scotia, where it may be remembered, *Capt. Charles Brome*, R.A. had been Commandant of Artillery since 1751.[6] Anxious and arduous was this command—in equipping the armaments of Halifax,

Armament, 40 pieces.
24-prs.
12-prs.
9-prs.
6-prs.
13″ mortars.
5½″ cohorns.

[1] Ordnance Warrant Books, No. 3, pp. 193, 194; No. 4, p. 275 (four 12-prs., six 6-prs., eight 4⅘-in. mortars).

[2] With Asia and Africa we shall not be immediately concerned in these *Memoirs*, the *Brome-Waltons* not having been engaged in these operations; although the majority of their descendants are now connected with our Indian Empire.—(*Vide* family tree in Chap. I.)

[3] "Proceedings" R.A.I., Vol. XX., No. 8, p. 413.

[4] *Ibid.* Son of Captain *Joseph* Brome, grandson of Captain *Chas.* Brome. Cadet: commissioned 1st June, 1753; died 24th March, 1808, Lieut.-General, Colonel Commandant R.A., Master-Gunner of England (St. James's Park and Whitehall).

[5] "Modern Europe," (Russell), Vol. II., p. 442. Carlyle's "Frederick the Great," p. 305.

[6] "Proceedings" R.A.I., Vol. XX., No. 9, p. 485.

George's Island, and Annapolis Royal,[1] rearing block-houses, drilling and arming local militia, &c., with only one regiment of infantry and one company of artillery—ever since that memorable 28th August, 1753, when the fiat went forth from Downing Street, "Stand on your defence over there! Repel by force any Foreign encroachments on British Dominions:"[2] yet, how efficiently *Brome* had drilled his gunners is evidenced by the following extract from diary of Capt. John Knox, 43rd regiment, who arrived from England in 1757:—

"*1757. Fort Cumberland* (N.S.) . . . in the afternoon two brass 6-prs. were drawn down to the outside of our trenches, to try how often they could be discharged in the space of one minute, with deliberation and in such manner as to do service: for this purpose they (R.A.) had a target erected, which was soon demolished; the guns were fired eleven, twelve and thirteen times, in that short space, without any accident, and were well pointed."[3]

With inimitable phraseology, Carlyle has depicted the circumstances of the opening conflict, the gallant services of the afterwards celebrated George Washington,[4] the noble efforts of the good Samaritan Benjamin Franklin, and the tragic fate of the brave but incompetent Major-General Braddock[5] at Fort *Du Quesne*, across the Alleghanies, on that "ghastly July day, 1755, when his detachment of Royal Artillery (*field* train), under command of Captain Thos. Ord, R.A. was cut to pieces and its ten guns captured;"[6] and it would be impossible to excel in succinctness Colonel Duncan's account of the closing operations, on land, of the Royal Artillery of the 1757 expeditions against Louisbourg and Quebec:[7] but it has become necessary to ransack the Ordnance records, muster-rolls, and official despatches, of 1755, to disperse the fog which envelops the R.A. *siege* train operations of that year, on the fog-bound coast of Nova Scotia, under command of *Captain Charles Brome*, R.A.

Under Royal Warrant of 5th November, 1754, the Board of Ordnance had despatched a *field* train of artillery, on board H.M.S. "Lynn," from Spithead, which is of exceptional Artillery interest as the first occasion of employment of *case shot*, which had recently been "invented" by Lieutenant Abraham Tovey, R.A.[8]

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[1] These timber and earth fortifications had been considered sufficient protection against Indian enemies in this barren and swampy region.—"Journal in North America" (Knox), 1757, p. 30.

[2] Carlyle, p. 305.

[3] "Journal of Campaign in North America" (Knox), Vol. I., p. 51.

[4] Lieut.-Col. Washington, at this time 23 years of age, was given command of one of the locally raised Royal American regiments, 1000 strong. He had been Militia Adjutant since 19 years of age, and had previously been midshipman.

[5] Carlyle's "Fredrick the Great," pp. 300 to 309. "Annals of War" (Cust) 1755, pp. 161, 162. —Carlyle and Sir E. Cust present only a garbled account of the *Du Quesne* tragedy: but we may not digress further than to observe that the American is the only complete record, *vide Montcalm and Wolfe* (Parkman).

[6] "History of the Royal Artillery" (Duncan), Vol. I., pp. 158–9.

[7] *Ibid*, pp. 194 to 205.

[8] For the *Tovey* family *see* Chap. I., Lieut. A. Tovey was also the first modern British father of *shrapnel shell*, and the want of his shell was much lamented by the gallant R.A. defenders of Minorca, 1756 ("Proceedings" R.A.I., Vol. XX., No. 11, p. 580). "Little Abra's" letters to the Board were ever in the strain of "see what a good boy am I; send me *on service anywhere*." Colonel Tovey died at Gibraltar of grief, 1781, at failure of his three days' salvo of artillery, while commanding R.A. in the great siege. Little man, with great mind and noble soul: how much you deserve a regimental *Memoir*. You rank among the heroes of your day!

TRAIN OF ARTILLERY TO ATTEND THE FORCES FOR NORTH AMERICA, UNDER COMMAND OF MAJOR-GENERAL BRADDOCK.

In Charge of.	1st Lieutenant and Adjutant.	3rd Lieutenant. Fireworker.	Cadet.	Commissy. of Horse.	Quartermaster.	Waggon Master.	Paymaster.	Surgeon.	Clerk of Stores.	Conductors.	Artificers (detailed).	Servants.	Necessary Women.	Guns. 12-pr.	Guns. 6-pr.	Shot. Round.	Shot. Grape.	Shot. *Case.* and with wooden bottoms.
Captain Robert Hind.	Robert Smith.*	Thomas Howdell.	D. Delacour.	2nd Lieut. W. Macleod.	2nd Lieut. F. J. Buchanan.†	2nd Lieut. F. J. MacCulloch.†	Mr. James Furnis.	Mr. Thomas Blair.	Mr. W. Marsh.	1	12	10	6	4	6	2400	100	1600
														Sgts.	Cpls.	Bombrs.	Grs.	Mat-rosses.	Drummer.
													2	2	8	18	29	1
Joined the *field* train, as Commandg. R.A., by order of General Braddock:													1	1	1	6	3	—

From Newfoundland, Capt. T. Ord, R.A.

From the Fleet, 30 seamen, with 30 musquets.

		* Killed.	† Wounded.	
R.A.	Officers	1	2	at Fort *Du Quesne*
	Sergeants	3	0	
	Corporals	2	0	
	Bombardiers	3	0	
	Gunners	7	6	
	Matrosses	5	1	

Captain Ord was wounded (*Parkman*, Vol. I., p. 227) ; but is not included among the wounded in R.A. Muster-roll.

This Train was consigned to Boston, in view to operations in the south (Virginia) ; and General Braddock was instructed to supplement its *personnel* by withdrawing as many artillerymen from the two companies in Newfoundland (Ord's) and Nova Scotia (Brome's) as he might deem necessary, with due regard to the defences of those commands[1] (as, owing to requirements of East and West Indies, Scotland, and Ireland, and the critical condition of Europe, not one of the companies R.A. at home could be spared). In addition to the *field* train several engineers were embarked.

On arrival, in February, 1755, with two regiments of foot, each 1000[2] strong, the train, and engineers, to operate in Virginia and across the Alleghanies, General Braddock organised a central column (with which we are not concerned), composed of local levies and Indians, and as Captain Ord had brought from Newfoundland only 12 N.-C.O. and men of R.A., the General obtained from Commodore Keppel's squadron 30 seamen, with 30 bright barrelled musquets with bayonets, as addi-

Centurion, Norwich, Syren, Seahorse, Garland, Nightingale.

[1] *See* "England's Artillerymen" (Browne), p. 25. The conjoint England and Newfoundland detachments with the *field* train, under Captain Ord, have been tracked in monthly rolls in the hope that they might be found to have developed into a company R.A. now surviving; but by 1758 they had been killed, disabled, taken prisoners at Oswega, or dispersed with the expedition to the West Indies.—*R.H.M.*

[2] *i.e.*, 700 each from England and 300 local levies.

tional gunners. In the north, Governor Lawrence, at Halifax, was entrusted with the defence of Nova Scotia and the *siege* operations requisite to drive the French out of that province where they had established themselves since the peace of *Aix la Chapelle* at the head of the Bay of Fundy, in a series of forts, the principal of which, on an eminence commanding a delightful prospect, was appropriately named Fort *Beau-séjour*, and mounted 26 guns—with garrison of 1500 men [1] and a mixed force of Acadians and Indians encamped without (*Mémoires sur le Canada*, 1749–1760). The forces at Governor Lawrence's disposal were two battalions of the Louisbourg Grenadiers (light infantry), each 1000 strong—who had been raised in the spring—under Lieut.-Col. Monckton (47th Regiment), one English Regiment of Foot (47th)[2] and Captain Charles Brome's company of Royal Artillery.[3] His naval force consisted of three small frigates (under Captain Rous, R.N.), which brought from Commodore Keppel's squadron, some guns and shot to supplement the *siege* train.

Success, Mermaid, Syren.

Captain Brome's company therefore marched from Halifax to Annapolis, in which latter garrison the company was mustered on 1st May [4] —the *siege train* having to be conveyed from Annapolis by the Navy—and on 9th June the company was mustered at "camp before Fort *Beau-séjour*." The nature of the ordnance embarked with the siege train is not stated in any official despatch; but the Ordnance records shew that to supplement the train Captain Brome obtained "by order of General Braddock" (from Keppel's squadron *per* Rous's frigates), four 12-prs. on naval carriages, four mortar *beds*, 1000 shot.[5] The whole besieging force, including two engineers, were under Lieut.-Colonel Monckton.[6]

Arrived at Fort Lawrence, two miles from Fort *Beau-séjour*, Colonel Monckton despatched a force, with three 6-prs. R.A., to destroy a block-house and breastwork (defended by 400 regulars, Acadians and Indians)—which opposed his crossing the Missaguash in front of *Séjour*—a service which was speedily and effectually executed. (*Montcalm and Wolfe*, Vol. I., p. 248).

Siege of Beau-Séjour 1755.

After five days of open trenches, from 21st June, and four days' bombardment, Fort *Beau-séjour* surrendered; its name was thereon changed to Fort Cumberland (being the second fort in America named after H.R.H. the Duke); next day the two smaller forts also surrendered; 15,000 Acadians were disarmed; and thus, happily, was secured the permanent tranquility of Nova Scotia.[7] The English lost 40 in killed and wounded. Lieutenant W. Martin, R.A., two gunners, and Ensign William Hay (62nd Regiment, Royal American) with his detach-

[1] *London Gazette*, 1755, No. 9497,

[2] Now the *Loyal North Lancashire.*

[3] *Broken up in 1819.*

[4] Muster Roll in R.A. Record Office.

[5] "Ordnance Warrants Book," No. 3, pp. 172, 173. The four mortar beds must have been *ex*-Bombships, of Keppel's squadron, as the Royal Navy, proper, had not any *shell* in 18th Century, nor until 1826; nor were sailors taught to fire cannon until 1793.

[6] Governor Lawrence's Despatch of 28 June, 1755. *London Gazette* 29 July, 1755.

[7] "Annals of War," 1755, p. 160. "History of the R.E." Vol. I., p. 171.

ment of guard over the guns, were taken prisoners in the advanced trench, in a night sally of the Acadians. (*Muster roll*; and *Parkman*, Vol. I., p. 252.) The bombardment demolished the French barracks; one of our 13-in. shells, which entered a French casemate, killed Ensign Hay (a prisoner), and also three French officers, wounding two others; but Governor Lawrence adds the extraordinary announcement that after four days' bombardment the fort surrendered "before we had mounted a single cannon on our batteries." [1] Governor Lawrence was an American. Another extraordinary incident connected with this siege of Fort Cumberland is thus narrated, in 1757, by Captain John Knox, 43rd Regiment, in his "Journal":—

"*Octo., 1757—Fort Cumberland.* The enemy had a chain of Forts between this and Bay Verde. . . . I cannot dismiss this subject without relating that when the French were in possession of this garrison (1755) they had no artillery; however, being remarkably fruitful of invention, they were not at a loss to deceive their enemies at Fort Lawrence, for they provided a parcel of birch, and other hard, well-grown trees, which they shaped and bored after the fashion of cannon, securing them from end to end with cordage; and from one of these they constantly fired a morning and evening gun (as is customary in garrison); but, upon the reduction of this place, and a spirited enquiry after the cannon, they found themselves obliged to discover their *ingenious device*." [2]

Was this infantry journalist a wag?

Against this, Governor Lawrence's despatch of 28th June, 1755, states:—"The Fort *Beau-séjour* had 26 pieces of cannon mounted. The French had also cannon mounted on a blockade on their side of the river." The French account reads:—"*Il étoit garni de vingt-et-une pièces de canons, d'un mortier de 16 pouces.*"—*Mémoires sur le Canada, pp. 45–6.* Twenty-four cannon, one mortar, according to American State Records. (*Montcalm and Wolfe*, Vol. I., p. 241.) Parkman, who had consulted American State Records, reports (Vol. I., p. 249) that the fire from the French cannon destroyed one of our small mortars: that the fire was brisk on both sides; and that, after the capitulation, the British flag on Fort *Beau-séjour* was saluted by our gunners with "a general discharge of the French cannon" (p. 251).

The explanation is given by the American writer, Parkman, who quotes (Vol. I., p. 250) from the Journal of Surgeon John Thomas, that the shells from our large mortars (13-in.) bursting through one bomb-proof killed six officers, and also Ensign Hay, a prisoner; and as the Commandant Vergor and the political Priest, Le Loutre, were at the time in an adjacent "bomb-proof," the effect was immediate; and the white flag was instantly hoisted before our gunners had time to get their (other) cannon into position. The French account in *Memoires sur le Canada*, p. 49, is:—"*Enfin le 16 au matin, une bombe tombée sur une casemate . . . . . ce que fit rendre le Fort . . . . .* (and quotes names of the killed and wounded) . . . *Le Général Anglois*

[1] Despatches 28 June, 1755. *London Gazette*, No. 9497. Brigadier Monckton distinguished himself at Louisbourg in 1758; and fell nobly at Quebec, 1759, where Wolfe was mortally wounded in leading on the gallant Louisbourg Grenadiers.

[2] "Campaign in North America" (Knox). Vol. I., pp. 58, 59.

fut surpris que n'ayant jusqu'alors tiré que quelques bombes, et ignorant l'effet de cette derniere . . . . ."

Thus the actual fact was that the surrender of this French stronghold—with garrison of 1500 soldiers, besides native levies—and the resultant security of Nova Scotia, were wholly due to the excellent and effective shell practice of the Royal Artillery under Capt. Chas. Brome, R.A.

Terms of Capitulation.

Proposed.—(In marching out) . . . "Le Commandant aura à la Tête de sa garnison six Pièces de Cannon du plus gros Calibre, et un Mortiér, avec cinquante coups de Poudre à chaque Pièce. La Garnison seront envoyés directement par Mer à Louisbourg."

Granted.—"The Commander, Officers, Staff Officers, and Others . . . . shall march out with their Arms, Baggage, and Drums beating."

In his Despatches of 28th June, Governor Lawrence states that we captured an immense quantity of arms and stores; but does not particularise any cannon.[1] The French account runs . . . "*il étoit pourvu abondamment de munitions de guerre et de bouches.—Mémoires*, p. 46.

Captain Knox adds (Vol. I., pp. 55–56), "The Fort, which is a pentagon, is situated on an eminence; was erected by the French after the Treaty of Aix la Chapelle; had a ditch . . . . .; and the artillery now mounted here (1757) are 6-prs., 9-prs., and 12-prs., a few 9-inch mortars, and some cohorns."

The French must, indeed, have been "fruitful of invention" to have hoped to dispossess the British of the unrivalled harbours and bays of Nova Scotia "by *gunshots of ingenious device*" from Fort *Beau-séjour* while their fleet, in 1755, dominated Cape Breton, and their Louisbourgh Arsenal was within hail? The feat is not impossible :—

> For as with *gonnes* we kill the crowe
> For spoiling our releefe;
> The deuill so must we overthrowe
> With *gonshote of beleefe.—Gascoigne.*

By muster-roll of 1st September, 1755, Captain Charles Brome had returned to Halifax, from Fort Cumberland, leaving in the fort the detachment, who were there when Capt. Knox's (43rd) regiment[2] arrived in 1757 and witnessed the rapidity of artillery fire: and, by muster roll of 1756, Capt. Brome's company furnished 1 officer, 6 N.-C.O., 30 gunners and matrosses for the *field* train with the army "on the Continent" in replacement of the R.A. who had perished at *Du Quesne* and in later operations.

"On Ye Bombs."[3]

Whence came ye Bomb—*pot d'enfer?*

Words sometimes fossilize history, as amber does the fly;[4] and the

[1] *London Gazette*, 1755, No. 9497.

[2] *Now the Oxfordshire Light Infantry.*

[3] The term employed in R.A. muster-rolls to indicate staff service on bomb-ships.

[4] Archdeacon Trench *On Words*, "Amenities of Literature," by the elder Disraeli.

word is universally accepted as having owed its tertiary or popular derivation to the *bombos* of the siege of Syracuse, the unearthly *noise*[1] made by the tubes of Archimedes, Master-Gunner of Greece,[2] which terrorised the Roman besiegers, under Marcellus, B.C. 212, who helplessly beheld the burning of their ships and the sinking of their five-banked galleys in the harbour by projectiles hurled through embrasures[3] by the great Master of Artillery. Its secondary derivation belongs to the OM or fire (sun) principle or element (referred to in Chapter I.), and there is only a shade of difference between the archaic significations of *Bomb* (B'OM) and *Brome* (Br'OM), the son or agent of Fire, *i.e. Fireworker;* but its prime is of course the racial ○, sun, or bomb letter.[4]

Alas! by the untimely death of that great master of artillery, in the casemate of Syracusae, his secrets were lost; and we know not of a certainty whether our mediœval substitutes are the same. We have, however, identified the Greek fire of Byzantium with the Marcus Græcus ingredients of gunpowder A.D. 1000[5]; in the Museum of Artillery at Woolwich we possess one of the monster bronze tubes (screw gun) of Muhammed II., the conqueror of the Greek empire; and who shall differentiate the tubes by which—

(*a*) In Asia, the Oxydracae, those "holy men of old, beloved of the gods," overthrew the Egyptian Hercules with "tempests and thunderbolts shot from their walls," before whom the Great Alexander prudently retired.—"*Apollonius Tyannaeus," by Philostratus (L 2, cxiv.),* quoted in "Military Antiquities" (Grose), Vol. I., p. 392.

(*b*) At Syracuse, B.C. 212, Archimedes sank the 200-oared Roman galleys in that harbour.—*Livy,* 24/34. Plutarch's *Marcellus.*

(*c*) At Constantinople, A.D. 1453, Muhammed II. sank, by *vertical fire,* the chain of Greek ships defending the Golden Horn.—*General Sir Henry Lefroy, F.R.S.,* "Proceedings" R.A.I., Vol. VI., No. 6, p. 209.

(*d*) Near Syracuse, New York, A.D. 1887. Balinski's tube sank the two-masted experimental hulk, by vertical and horizontal fire, from Fort Lafayette.—*Official Report* (blue-book) 1887. (?)

According to Siemienowicz,[6] the smaller *Bomb* or *Grenado* (so named from the Punic fruit, the rind of which encloses a vast number of pungent *grenates,* or grains, or pellets—and this, he adds, is the same

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[1] Greek thesaurus. "Military Antiquities" (Grose), Vol. I., p. 394.

[2] *See The Master-Gunner of England* ("Proceedings" R.A.I., Vol. XIV., No. 3, p. 97). *Archimedes, inventor ac machinator bellicorum tormentorum.* Livy, 24/14.34.

[3] *Livy,* 24/34. Plutarch's "Life of *Marcellus.*"

[4] "Origin of Language" (Kavanagh), Vol. I. With the gunner's Bomb or semi-Bomb ○ ○ C, and vertical or horizontal *tau* T, anyone can construct the alphabet and language of the whole Indo-European family. Truly may it be affirmed of the Ubique Bombardier, as of the Sun,

"*His* LINE *has gone forth thro' all the world,*
His WORDS to the end of the earth."

[5] "Proceedings," R.A.I., Vol. XX., No. 6, p. 300 (note 1). *The Master-Gunner of England,* "Proceedings" R.A.I., Vol. XIV., No. 3.

[6] Siemienowicz, p. 210 of Sherlocke's translation of "The Great Art of Artillery."

with the African and Carthagenian)—preceded the monster bombs in Europe. The former were thrown by hand since the days of Gideon's "*fire-pots*, with torches (fuzes) within the pots" (*Judges*, vii. 16), until by Royal Warrant, 13th July, 1678, Charles II. granted an annuity of £20 to John Finker for having "invented" a new way of shooting *hand grenadoes* out of small *mortars*; but the larger were projected from gunnés and mortars by horizontal and vertical fire, indifferently.[1]

Oculists tell us that the citizens of London are becoming congenitally near-sighted by reason of the optic nerves being ever focussed to the length of the narrow streets in the contracted horizon of their vision: even so, is not it hazardous for the modern bombardier to strain at a longer historical focus than that acquired in boyhood when "taught to believe" that gunpowder was invented by Friar Bacon, and that cannon were first employed at Creçy?

It would be profitless to pursue this subject further; and to prolong this prelude would but serve *tourner autour du pots*. The *Bombs* with which we are now to be more immediately concerned are not the projectiles, but the floating batteries from which these were projected in naval operations against ships and forts, termed indifferently *The Bombs*, *Bomb Vessels* or *Ketches*, *Tenders*, *Fire-Ships*, and *Galleys*.

Naval histories and Ordnance records have not yielded any appreciable light upon *Bomb-ships*—not because *data* do not exist, but because the special subject has not been searched out. Nine lives would not suffice to repair the gaps in Naval and Military histories; and there is neither a Navy nor Army record office. The Committee over which Lord Airey presided, on army reform, recommended the establishment of an army record office, but not in a way to commend itself to the civil side of the War Office.

In July last, under presidency of the Marquis of Lothian, was held the first general meeting of the members of a voluntary association styled *The Navy Records Society*; and their first resolution was that . . . . "there is no history of the Navy worthy of the name."[2] A similar resolution would have to be framed by an *Army Records Society*? Of all the Naval treatises consulted for purposes of these "Memoirs," not one is worth much more than the value of waste paper, except James's (which is the work of a "sixth rate"); and on the writer's applying at the Admiralty for information concerning *Bomb-ships*, he was politely directed, by letter of 20th September last, to make search for himself at the Rolls House, Chancery Lane! The fact is, that until the present century the composition of war-ships was half Naval, half Military; and in particular epochs the records of services on sea and land are consequently interdependent and interlace. Both require a conjoint *Army and Navy Records Society*—which

[1] Capt.-Quartermaster Hexham's "Art of Artillery in the United Provinces," 1641 ed., p. 28. "Artifices, De feu" (1603 ed), p. 158. "Art of Gunnery" (1670), by Master-Gunner Nye. "Pyrotechnia" (1635), by Gunner Jno. Babbington. For opportunity of reading these curious works on bombs, fuzes, *shrapnel*, and mortars, &c., I am under much obligation to the Director of Artillery's Department. The Archimedean combined sphere-and-triangle is a prominent feature in these works. Although first fruits of the printing press in England, these are but modern authorities, for the weapons are infinitely in advance of the writers. I have also to acknowledge help from the Intelligence Department of the War Office.—*R.H.M.*

[2] *Army and Navy Gazette*, 8th July, 1893, p. 569.

would fittingly form a bureau of the *United Service* Institution. The only approved stone wherewith to build the fane of regimental history is the *muster-roll* (and pay list); and with the utmost deference it is submitted that the destruction or abolition of a muster-roll or pay list inflicts an injury upon posterity.

The ships of war of Henry VII., Henry VIII., and Elizabeth were of considerable size, manned with average of 700 men, viz.: marriners 450, under the master or captain; gonners 50 (R.A.), and souldiers (infantry) 200, commanded by an officer of the Royal Artillery.[1] The marriners were armed with snaphaunce dagger-musquett, cutlass or short sword, and pole-axe; the souldiers were to "attend upon" the gonners, on board—just as "men of the army" were "appointed to attend the Ordnance," on land.[2] The dual command was unhappy, and was necessarily modified, from time to time, by the force of individuality; but continued, for the *Bomb-ships* especially, until 1804, as exemplified in the subjoined collation from R.A. muster-rolls:—

LIST OF ROYAL ARTILLERY ON BOARD H.M. BOMB VESSELS IN 1803-4.

	Rolls.	Commander.	Name of Ship.	Sergeants.	Corporals.	Bombardiers.	Gunners.	Battn. R.A.
	1803.	Royal Artillery.						
	July	Lieut. A. C. Macartney.	*Sulphur.*	1	—	—	9	5th
	Aug.	" T. A. Brandreth.	*Zebra.*	—	—	—	7	
	Nov.	" *Hon.* H. Gardner.	*Discovery.*	—	—	1	10	6th
	Oct.	Capt.-Lieut. H. Fraser.	*Explosion.*	1	—	—	9	2, 5, 6th
	Nov.	Lieut. Duncan Grant.	*Vesuvius.*	—	1	—	9	
	Sept.	" J. Briscow.	*Tartarus.*	—	—	1	10	3rd
Where not otherwise specified, these ships were on active service with Nelson's Fleet.	July	" J. Adams.	*Countess Cardigan* (Tender to *Vesuvius*).	—	—	1	9	
	"	" J. F. Fead.	*Fury.*	1	—	—	10	4, 6th
	Dec.	" S. Rudyard.	*Volcano.*	1	—	1	8	4th
	July	" J. Taylor.	*Hecla.*	—	—	1	9	3, 4th
	"	" E. Smyth.	*Terror.*	1	—	1	8	
	1804.							
	June	" T. F. Fead.	*Lucifer* (Downs).	—	—	1	8	3rd
	Apr.	" H. Bowyer Lane.	*Thunder* (Spithead).	—	—	1	9	
	Jan.	" W. D. Holcombe	*Perseus* (Downs).	—	—	1	9	1st
	July	" A. Thompson.	*Meteor* (Spithead).	—	—	1	9	2nd
	Oct.	" T. Mackonochie.	*Acheron* (Rose's Bay).	—	1	—	9	1st
	Dec.	" "	*Acheron* (Malta).	—	1	—	9	

The Brome-Walton's on ye Bombs.	1702	Capt. Albrecht Borgard / *Matross* Charles Brome	*Furnace.*	Royal Warrant Book 1715.
	1757	Lieut. Joseph Walton,	*Ibid.*	R.A. Muster-Roll.
	1797	" Joseph Brome, 2nd	*Judith.*	*Ibid.* Col. Congreve's Report

N.B.—Though indifferently termed "Bombs" in R.A. Rolls, some of these were gun-boats. Also, several of these had been at Louisbourg, 1758.

[1] "Military Antiquities" (Grose), Vol. I., p. 125. *See* Marble Tablet, in Royal Chapel, Tower of London (reproduced in Succession List quoted below).

[2] "Succession List of Master-Gunners of England," *anno* 1461. The pole-axe was in use by Royal Navy at Louisbourg ("Annals of War," 1758, p. 280).

The first employment of *Bomb-ships*, of which we have present record, was at the siege of Calais, 1347, when Edward III. "secured his lines by causing his Navy to lie near the shore, every ship being well filled with *bombardes* and other artillery[1]—which were mounted *en barbette*.[2] The *Bomb-ships* of this period are represented with one deck and one mast[3]; and the first R.N. List in which "Bomb-ships" are particularised is dated November, 1658; although land-service *mortars* accompanied the expedition to the Palatinate, 1620 ("Cleaveland MSS." p. 33), and both sea and land-service mortars are depicted in the English prints of 1603.

The French did not employ mortars for land service until the siege of *Gravelines*, 1658 (according to Monsr. Le Blond), and these were made by Mr. Malthus, an Englishman[4]; nor for Bomb-ships until bombardment of Algiers, 1681[5]; and, although English *Bomb-ships* have been shown to have been incorporated in our Royal Navy List of 1658, their first permanent establishment dates from the Ordnance Royal Warrant of 1686—quoted in full on p. 106 of the "Cleaveland MSS."—when the office of *Chief Bombardier of England*[6] was created analagous to that of the *Master-Gunner of England*. The extraordinary success of the Bomb-ships at the siege of St. Malo, 1693, with Admiral Benbow's squadron won the Royal favour of our Sailor King, and ensured their permanency.[7]

Serpent, Mortar, Firedrake, Grenado.

The Bomb-ship (vessel or ketch), named the *Furnace*, which Borgard commanded in 1702, in Spain, with *Charles Brome* as one of his matrosses, was armed with two 13-in. brass mortars (in addition to swivels), and had 800 empty bombs of 12¾, 800 fixed fuzes, 24 spare fuzes, 20 round carcasses 12¾.[8] In 1757, when Captain Charles Brome's grandson, Lieut. Fireworker *Joseph Walton* (son of Captain Joseph Brome), commanded the same ship—for siege of Louisbourg—she had two 13-in. mortars and eight heavy 6-prs.[9]

Port-holes not having existed until suggested by Colonel Congreve, R.A., in 1796, the mortars and guns were mounted *en barbette*. Colonel Congreve then stated that up to that year these mortars had always

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[1] Rapin's and Grafton's "Chronicles," quoted in "Cleaveland MSS.," p. 4. That *bombardes* meant exclusively *cannon*, because *bombs* (grenadoes) were not then known, is the mere *ipse dixit* of 17th Century—of which more anon. Mortars and bombs are coeval with cannon.—*Traité d'Artillerie* par Le Blond, p. 36.

[2] Port-holes first appear in the representation of *Henri Grace "à" Dieu*, 1515 ("Naval History," James, Vol. I., p. 5). Port-holes (embrasures) for *Bomb-ships*, were approved by the Admiralty, 1796–7, on recommendation of Colonel Congreve, *R.A.* (Official Report in R.A. record office).

[3] "Archæologia," Vol. VI., pp. 202, 205, 207.

[4] *Traité d'Artillerie, par* Le Blond, 1745, p. 37 of English translation. A copy of Malthus's Treatise is in R.A. Institution.

[5] "Military Dictionary," 1779 (Smith).

[6] The Succession List of *Chief Bombardiers* of England has not yet been compiled. The office soon degenerated into an *officium sine locum* when Marlborough got into power; Colonel Jonas Watson, R.A., whose portrait is in R.A. Institution, held the honorary dignity. The *Chief Bombardier* is now represented by the *Royal* or *Queen's Bombardier* at Windsor Castle.

[7] "Cleaveland MSS.," pp. 132, 135.

[8] Ordnance Warrants Book, 1715.

[9] Colonel Congreve's Report to the Admiralty, 1796.

been fired at an angle of 45° (with charges up to 13 lbs. of powder); that the mortars were not intended for use in the open seas; and that the guns were for "protection against privateers."

Their size was not great, but the enormous strength of these vessels will be manifest; and, although many foundered by reason of the low free-board, their durability and sea-going qualities were such that the *Grenado*, Bomb, of 1693, crossed the Atlantic in March 1757, with the fleet destined against Louisbourg, as did also the *Furnace* of 1702, which went through the war in North America, under command of Lieut. Walton, who also fought it in the 1761 expedition in West Indies, while several of the Bombs with Nelson's fleet, in 1803–5, had done good service at Louisbourg in 1757. Colonel Congreve also adds that "Bomb-ships, in having mortars on board, are more terrible to an enemy's fleet than any other kind of vessel."

In 1796, Colonel Congreve's experiments with the *Vesuvius* Bomb in replacing the two 13-in. mortars and eight 6-prs. by two 10-in. mortars, four 68-pr. and six 18-pr. carronades[1] were so successful that the entire fleet of bomb-ships and gun-boats was re-armed accordingly, and with this armament fought under Admiral Nelson. The illustrations of the Bomb-ship, now produced, are from the Official report of Colonel Congreve, R.A., Comptroller of the Royal Laboratory. (The war-ship commanded by Captain Pyne, R.A., in 1663, has been illustrated in the *Succession List of Master-Gunners of England*).

In 1797, Colonel Congreve reported that it would be improper, and not according to the usage of nations, to fire shell from H.M. Navy.

The *Bomb Tender* was a smaller vessel of war, laden with ammunition and shell, &c., to supply the *Bomb-ship* with fitted shell, &c.; but in 1797 the tender was abolished.[2] The *Galiot or Fire-ship* is accurately described and illustrated in Grose's "Antiquities," Vol. I., p. 410: for account of its employment during siege of Quebec, *see* Knox's "Campaign in North America," Vol. I., pp. 298, 300.

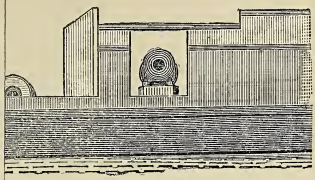
Lieut. *Joseph Walton's* fighting orders for Bomb-ship and Tender, in the American War (Louisbourg and Quebec), under Admiral Boscawen, and the like orders in the expedition to the West Indies, with Admiral Rodney's fleet, 1761, are preserved, in original, with the *Brome-Walton family* documents, and will shortly be deposited in R.A. Institution. No other record of the kind is known to exist.

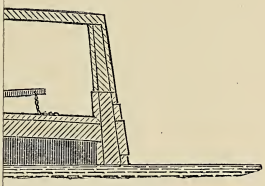
In 1757, for the expedition to America, *Marine Light Infantry* were permanently organised. In 1824 the French, who had been so far behind us in naval armament, suddenly adopted great changes in naval artillery, and introduced *shell* ordnance on board their ships, in general,[3] which led to a Committee of Ordnance at Woolwich, in February 1826, appointed by the Duke of Wellington: and the Committee reported that although the operation of live shells from guns on board ship is very objectionable, from its dangerous and destructive character, yet, as foreign Powers meditated this kind of warfare, we

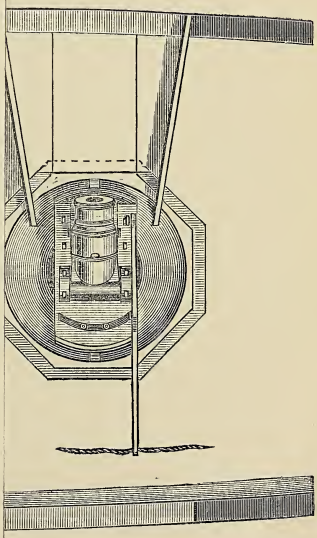
[1] These were subsequently replaced by light, 32-pr., short carronades, designed by Colonel Sir Alexander Dickson, which were officially commended by the Admiralty.

[2] "Military Dictionary" (James).

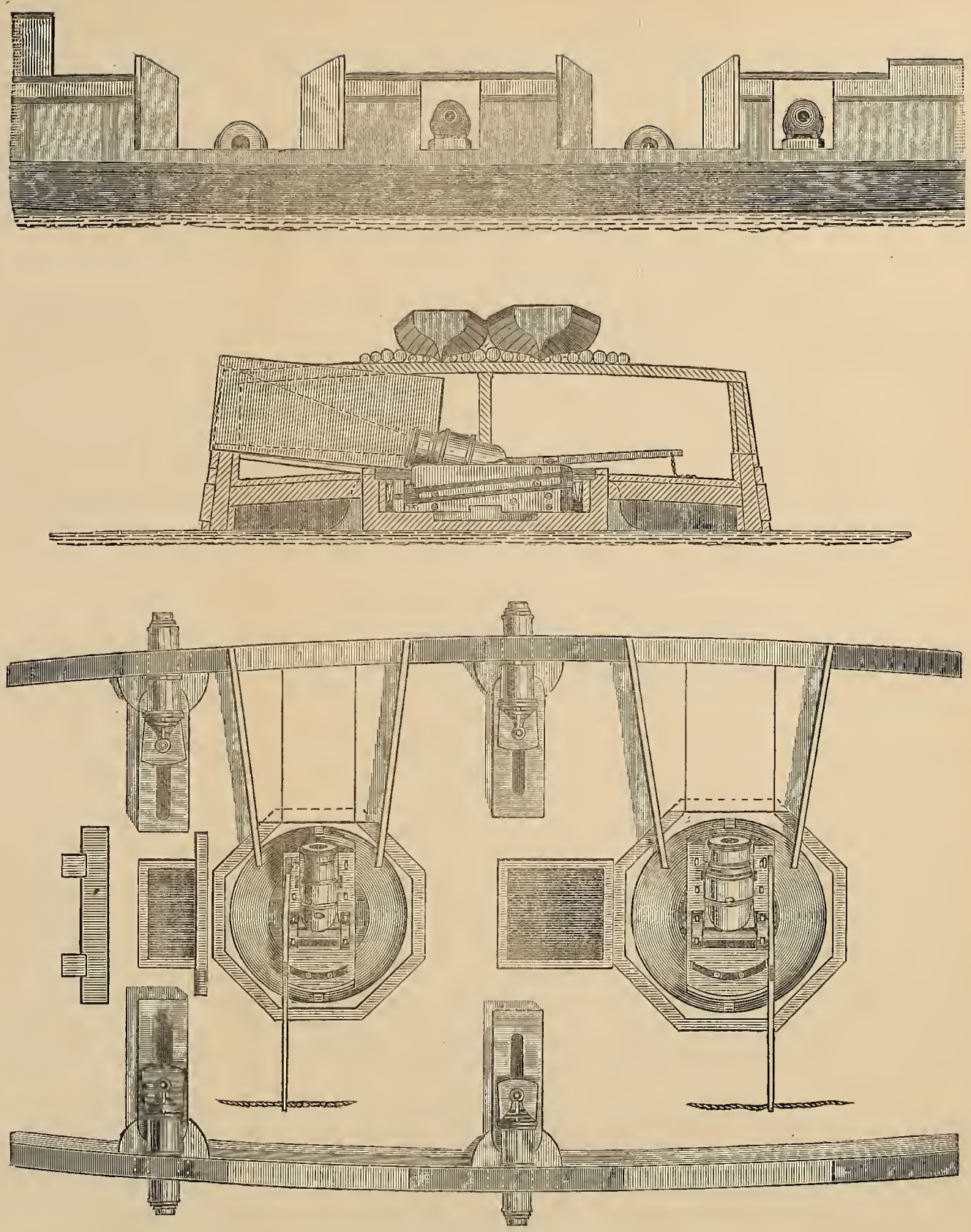
[3] *La Nouvelle Force Maritime, par* Paixhans; Paris, 1821.







eve, R.A.)



BOMB-SHIP

(From a Drawing by Col. W. Congreve, R.A.)

1796.

should not be behind; and their knowing that we are likewise prepared may tend to cause the employment of live shells to be mutually laid aside![1]

In 1804 the *Royal Marine Artillery* was created, from the Marine Infantry, by Royal Warrant—on recommendation of Genl. Sir Howard Douglas, R.A.—thus finally severing the connection of the Royal Navy from the Royal Artillery, of which Lieut. Mackonochie will go down to posterity as the last Royal Artillery Commander in the Royal Navy.

In 1832, Sir James Graham approved, also, of General Douglas's scheme for training the seamen to handle guns and mortars, and for substituting Naval for Marine Artillery Instructors and Master-Gunners[2] on board the training-ship *Excellent*—thus fixing the capstone to the automacy of the Royal Navy at the hands of a R.A. gunner.

* * * * * *

One item more about the Bomb-ships, *and we shall have done with these dreadfully dry details—which, however, have had to be got through in the interests of R.A. records.*

Service "On the Bombs" was popular with R.A. officers and men, and was regarded as Staff Employment—free cabin, messing, and wines for the officer; Royal Navy scale of free rations for the men: not only so, but when the full allowances happened not to be procurable, compensation for the difference was allowed by the Admiralty.[3] Powerful influence, or conspicuous ability at the academy, and experience in command of battalion guns, were *essential qualifications* of ex-cadet officers—for the following reason, extracted from *Essay on Early Artillery Establishments*, pp. 20, 21, by Colonel Miller, V.C.:—

"Men promoted from the Ranks seem to have been specially useful for mortar vessels (and bomb tenders), where the officer in charge had only his own practical experience to rely upon. General Belford complained, in 1762, of the great difficulty of finding cadet officers fit for this employment, and remarked that *if N.-C.O.'s are not made Lieutenants, here ends the Bomb service.* A letter in 1762, relative to taking steps for filling up some vacancies, for which there were *no gentlemen properly qualified either in the Academy or Drawing-room*, states that although Lord Townshend, the Master-General, in general disapproves of promoting N.-C.O.'s, yet, if any could be found fit for the position and worthy of the honour, His Lordship *may* take some future opportunity of providing for them."[4]

The N.-C.O. as an operative artyler had become past master in the *mècanique* of his profession, but did not necessarily possess the *savoir faire* and tact requisite in the delicate relationships of dual command on board ships of war, and the growing aggressiveness of Masters in the Royal Navy; while the speculative artillerist, from the then recently founded Academy, was apt to rely more on his *aplomb* and intuition

[1] *See* also "Naval Gunnery" (Douglas), p. 226 of 1851 ed.

[2] *Ibid*, p. 14.

[3] "History of the R.A." Vol. 2, p. 83; Ordnance "Orders to Paymasters." Lieut. Joseph Walton's requisition of 2nd March, 1757, for the gallions, *Furnace Bomb* and the *Keppel* tender, under his command.

[4] *See* also Colonel Duncan's comments in "History of the Royal Artillery," Vol. I., p. 115.

than on keeping *au fait* to professional "details." Due allowance was not made by Colonel Belford (himself an ex-cadet) for the rapidity with which the *really able* man—whether from the Academy or from the Ranks—adapts himself to the necessities of his environment; and so greatly had the new school of *Bomb Officers R.A.* commended themselves to Admiral Nelson that on one occasion he almost denuded the R.A. garrisons in West Indies of officers and gunners to man some of his ships, while the 1803–4 list, already given, proves that His Lordship's confidence was maintained to the end.

We are thus indebted to the hero of Culloden, and to a V.C. annotator for insight into this 18th century episode.

* * * * *

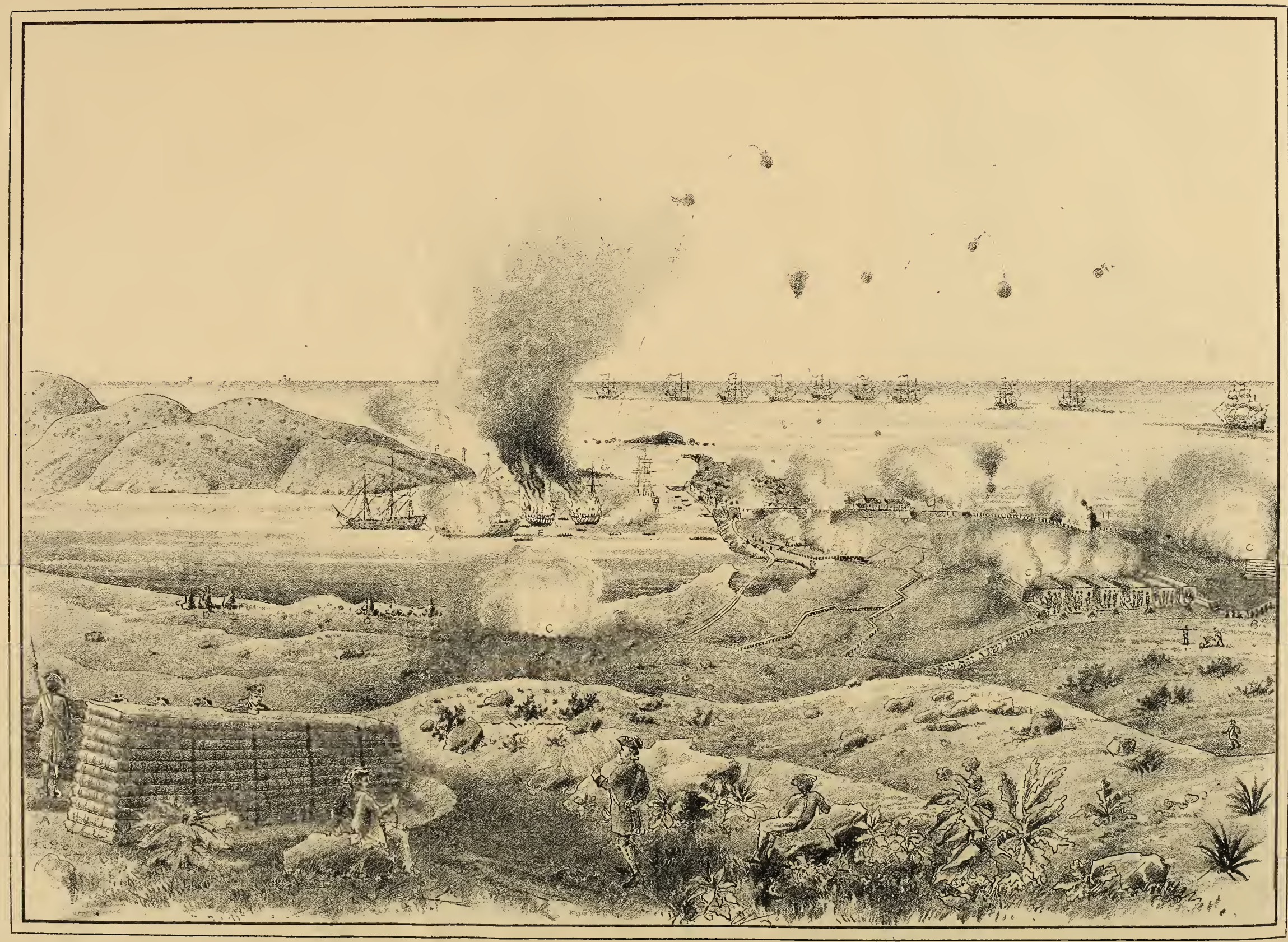
On the trackless deep the *Bromes* have been our pilots to navigate the Royal Artillery to the haven whence the future historian will have to muster the Bombs and Gun-Boats which earned the regimental charter of our heritage in the glorious achievements of the British Navy in sweeping England's enemies from the seas, up to that historic moment when the immortal Nelson yielded up his spirit on the quarter-deck of the *Victory*.

On land, the siege of *Beau-séjour*, 1755, has brought us nigh to the end of the historical "jungle," since *Charles Brome* led the way, in April 1698, when as yet the R.A. was not a permanent establishment; and now that the Committee of R.A. Institution have given its members the hitherto unpublished details of the Siege of *Minorca*, 1756, we are about to emerge into the light of day, with only a dense wood at *Minden* through which to drive the artillery field batteries into action at a trot.

The year 1757 gladdens the heart of the military historian, and lightens his labour. It is the birth year of continuous professional journalists, who now bear him company and provide historical materials ready to his hand. The conjoint Navy and Army expedition of 1757, to America, brought out its chronicler, Lieut. John Knox, 43rd regiment—a scholar and diarist of large powers of observation—in whose mines every historian of the period has wrought.[1] The R.A. with that expedition[2] consisted of a *Train* of two companies, under Lieut.-Colonel Williamson (who was promoted Colonel, to be on a par with Colonial Commanding Officers), for operations on land; and four *bomb-ships* (with Tenders) to co-operate with the fleet—two with Admiral Hol-

[1] "Journal of Campaigns in North America" (Knox), published 1769.

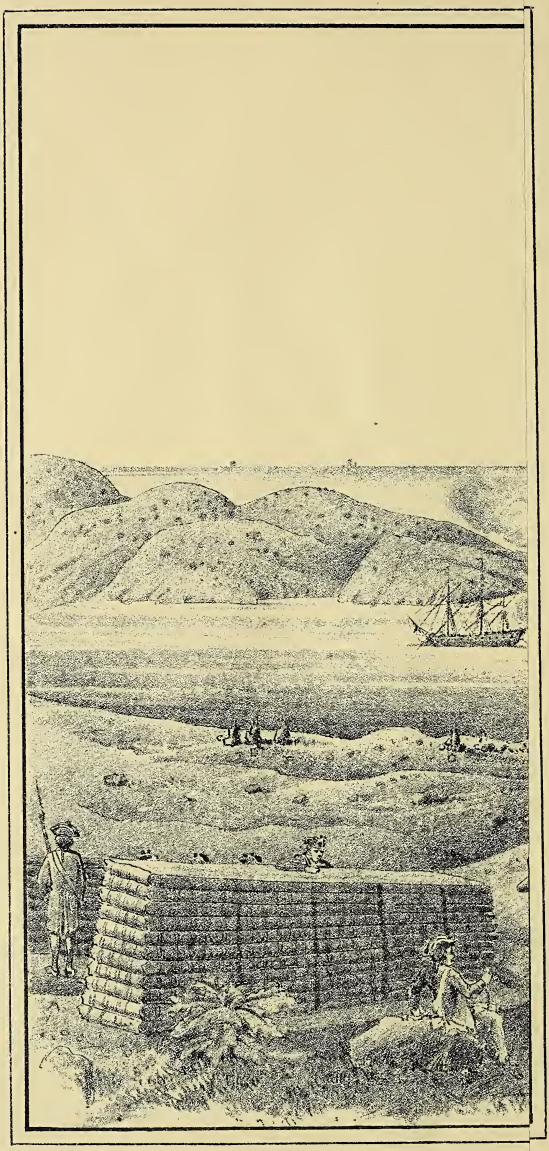
[2] The two newly raised battalions of *Highlanders*, created by Royal Warrant in *London Gazette* 22nd January, 1757 (1st Battalion commanded by Lieut.-Colonel Archibald Montgomery, 2nd Battalion by Lieut.-Colonel Simon Fraser), accompanied, to undergo their British baptism of fire, not by sprinkling but by whole-bodied immersion. On arrival, in 1757, a wing was quartered at Fort Cumberland (Beau-séjour), where also a R.A. detachment, of Capt. Chas. Brome's Company, and of 43rd Regt. were in garrison. The Highlanders could not understand English, and on one of them coming out of an adjacent wood, with long dishevelled hair over his shoulders and wrapped in dark coloured plaid, and not answering the challenge, he was shot dead by the infantry sentry, who reported to the sergeant of the guard that he had killed an *Indian*. On learning the truth, the unhappy sentry fell ill, and his life was despaired of during many days. (Knox's "Journal," Vol. I., p. 48). At Louisbourg, the infantry battalions were ordered to leave their *swords* behind (on the Transports), only the Grenadiers of the light companies going into action with the sword—(Knox, Vol. I., p. 160); and the *Wooden Horse* punishment (of Chap. I.) was still in force. (Knox, 1/97.)



Thorn, Eck, Woolwich

THE SIEGE OF LOUISBOURGH.

From a Drawing made on the spot by Captain Lieut. Thos. Davies, R.A.



From a D

combe's, and two with Admiral Hardy's squadron. The story of the *Train*, at the famous siege of Louisbourg, 1758, has been told with much acumen by Col. Duncan, in the "History of the Royal Artillery,"[1] and that gifted author's omission of the subsequent siege operations, which culminated in the capture of Quebec, is a sad loss to the Regiment, although some consolation has been afforded us by the industry of the author of "England's Artillerymen."[2] *Siege of Louisbourg.*

Among the unique Art treasures possessed by the R.A. Institution is a finely executed replica, by Captain-Lieutenant Thomas Davies, R.A., in 1762, of pen-and-ink sketch of the siege of Louisbourg,[3] taken on the spot by that officer in 1758, which, by the kindness of the Committee, is now reproduced for the benefit of Members; and as, during the siege, Lieut. Joseph Walton, R.A., and his junior, Lieut. Thomas Davies, R.A., were the commanders of the two bomb-ships at Lighthouse Point which rendered such distinguished service in destroying, by their bombs and carcasses, the three French war-ships in the harbour, the most fitting acknowledgment which the Royal Artillery can now render to the memory of Capt.-Lieut. Thomas Davies will be by giving place in these *Memoirs* to a summary of this gallant officer's services side by side with those of Lieut. Walton.

The fleet anchored two miles off shore, and the Army for the attack was conveyed in the following order[4]:—

FRONT.

Winchelsea. 20 Guns.
Captain Rouse.

Bombs:—

Furnace,
Lieut. Joseph Walton, R.A.

? *Vulture*,
Lieut. Thomas Davies, R.A.

Transports with the Land Forces.

Hawke.

Success,

REAR.

Kennington. 20 Guns.
Captain Diggs.

For the services of Lieut. (afterwards Lieut.-General) Thomas Davies (R.A.) we are indebted to the industry of General Sir Alex. Dickson, in collecting ancient *MSS.* relating to the Royal Artillery; and the summary of services now produced is from an original *MS.*, in handwriting of General Davies.

It would not be possible within reasonable limits to give a detailed narrative of the varied and successful career of Lieut. (afterwards Lieut.-General) *Joseph Walton*—son of Capt. Joseph Brome *née* Walton: grandson of Capt. Charles Brome.

[1] Vol. I., pp. 194 to 205. It must be noted that Capt. Ord's was not a *company* (as stated by Duncan and Browne), *vide* account herein of General Braddock's expedition, 1755. Ord commanded (*a*) train arrived from England; (*b*) 12 men brought from his company at Newfoundland; (*c*) detachment of Capt. C. Brome's company at Halifax, to replace others cut up at *Du Quesne*.

[2] "England's Artillerymen" (Browne), pp. 25 to 28.

[3] Spelt at the time Louisbourgh. . . bourg, or burg, indifferently.

[4] Knox, Vol. I., p. 19.

Statement of Services.

Lieut.-General *Joseph Walton.*	Lieut.-General *Thomas Davies.*
1734.—Born in Minorca,[1] son of Capt. Joseph Brome (*né* Walton).	
1753.—Gentleman Cadet R.M. Academy	
1755 (1st March).—Lieut. Fireworker R.A. *Nov.* command of 2 battalion guns with 3rd Foot (the *Old Buffs*).	1755.—Gentleman Cadet R.M. Academy
1756.—*Ibid.* (1st April) Promoted 2nd Lieut.	1756.—Commissioned Lieut. Fireworker, R.A. Second in command of battalion guns, with 3rd Regt. (Old Buffs) in Hyde Park.
1757.—1st Lieut. in command of H.M. Bomb Ship *Furnace*, with Expedition to North America[2] (Admiral Holcombe's squadron).	1757.—2nd Lieutenant. Command of *Grenado* Bomb, with Expedition to North America (Sir C. Hardy's squadron).[3]
1758.—Siege of Louisbourg (Cape Breton); and St. John's (Bay of Fundy). Command of Royal Naval Expedition on Lake George (July) as Commodore; command of artillery at Albany (Dec.)	1758.—Siege of Louisbourg; and St. John's, Bay of Fundy. Commanded the artillery at Fort Frederick until 1759.
1759.—Promoted Capt. Lieut. siege of Quebec,[4] in command of two Bomb Ships, until 13th July, when his two ships and two of his mortar beds became unserviceable with incessant firing.[1]	1759.—Promoted 1st Lieut. Joined the Army under Lord Amherst: was at the taking of *Tricondérago* and *Crown Point.* Appointed to the command of H.M. Naval Force on *Lake Champlain*, as Commodore, viz., two brigs of 18 guns and five radeaux of various sizes: also, appointed Bateaux Master for the Artillery Department.

[1] *Minorca, 1708*, captured by Major Borgard, R.A., under whom Charles Brome served; *1756*, capitulated to the Franco-Spanish Army; *1756*, re-captured by Royal Navy under Sir John Leake (son of the Master-Gunner of England), and R.A. under Capt. Thomas Flight; *1781*, capitulated to the French Army; re-captured, *1799*; *1806*, ceded to Spain at *Peace of Amiens*.

[2] The Expedition arrived at Halifax, Nova Scotia—where Lieut. Walton's grandfather, Capt. Charles Brome was Commandant of R.A.

[3] On the voyage, the *Grenado* Bomb Ship captured a French prize laden with stores and provisions for Louisbourg and Quebec.—*vide* "Campaign in North America" (Knox), Vol. I., p. 16. On arrival at Halifax the *Grenado* remained there for repairs, being "unfit for active service" (Knox, Vol. I., p. 19): and Lieut. Davies was temporarily transferred to another Bomb in 1758 for Louisbourg—believed to have been the *Vulture.—R.H.M.*

[4] For special operations, *see* "Campaign in North America" (Knox), Vol. I., pp. 298, 300, 316, 320-1, 326, 328, 333. The tradition in Brome-Walton family that Joseph Walton was the R.A. officer who dragged the solitary 6-pr. up the heights of Abraham is incorrect. I have sifted the whole matter and find that the author of "England's Artillerymen" is correct in ascribing this honour to Lieut. John Yorke, R.A. (p. 25). *See* quotations in *Army and Navy Gazette*, 17th December, 1892, p. 1071.—*R.H.M.*

13th July, 1759:—"Our batteries and the town still warmly engaged: our *Bomb Ships* ceased firing late last night, but renewed it this morning, and performed exceedingly well. * * * * Two of our mortar beds are already damaged by our own firing: the two Bomb Ketches have also suffered, and fell down this evening to Orleans for repair; their mortars to be landed with all expedition, and sent up to our batteries."—"Journal in North America" (Knox), Vol. I., p. 328.

Note.—With high angle firing, at 45° from 13-in. mortars, *en barbette*, almost daily, since 26th June, the extraordinary strength of these ships will be manifest.

Lieut..General *Joseph Walton.*

1760.—Joined the Army under Lord Amherst, and commanded Naval and Artillery detachments on Lake Ontario, under chief command of Col. Williamson, R.A. Was one of the four who took, on 17th July, a French frigate, *Ottawa*, of 10 guns,* after close action of 2 hours 15 minutes. Col. Williamson, R.A., commanded the two Bombs and two Galleys. Lord Amherst re-named the frigate as the *Williamson*.[1]

1761–2.—Expedition to West Indies with Admiral Rodney's fleet, in command of the gun boats. Siege and capture of Martinique.

1763.—Promoted Capt. R.A. in North America, and remained there in command until 1766.

1766.—Woolwich, command Company.

1772.—Minorca until 1775.

1775. to 1782. } Woolwich.

Lieut.-General *Thomas Davies.*

1760.—Joined the Army, at Lake Ontario. Remained Bateaux Master; and was appointed to the command of a galley. Was one of the four who took a French frigate of 18 guns, after a close action of 2 hours 52 minutes. After that commanded the Artillery detached with General Haldemand for siege of Fort Levy. Thence with the Army under Lord Amherst, for Montreal: hoisted the British colours thereon. Thence to explore the waters of the St. Lawrence, and to survey the western borders and boundaries of the waters and coasts of Lake Ontario to Niagara: thence to Fort Ontario, that river and Oneida Lake and adjacent rivers to New York.

*1 18-pr.
7 12-prs
2 8-prs.

1761.—Sent to Lake Ontario to survey and explore the southern shores of that lake, the Seneca and other rivers emptying therein; and to visit the various tribes of Indians bordering thereon. Returned in the winter to New York.

1762.—Survey of Lakes George and Champlain, to Montreal. Executed that and returned in the fall to New York. Promoted Capt. Lieut. R.A.

1763–4.—New York till June: then returned to England until 1764.

1764.—Returned to New York.

1765–8.—In New York and Canada.

1769–71.—England. Promoted Capt. in 1771.

1772–4.—England. Appointed *A. de C.*, without pay, to Lord Amherst, (Lieut.-General of the Ordnance.)

1775.—New York. Was at the battle (with a brigade of guns) of the *White Plains*, under Sir W. Howe. With that Army at the taking of *Fort Washington*. Thence with the Army under Lord Cornwallis to the *Jerseys*, with the command of the Artillery for that service.

1776.—Sent to Stratten Island to fit out the expedition for the *siege of Martinica*.

[1] For details of this plucky action, *see* "England's Artillerymen" (Browne), pp. 27-8.

Lieut.-General *Joseph Walton.*

1781.—Minorca, until December, 1782.

1782.—Promoted Major, in January. Defence of Minorca against the French, throughout the whole siege; and in command of the Artillery of the garrison at the commencement. Was retained by the French as hostage; and superintended all details of the evacuation. Promoted Lieut.-Colonel, 1st December.

1783.—Appointed Colonel Commandant of the newly raised *Invalid Battalion R.A.*

1786.—Married the Dowager Lady Strachan—widow of Sir John Strachan, *Bart.* (Capt. R.N., *Oxford*, 70 guns)—who died in 1833 at Upper Seymour Street, Portman Square.

1793.—Promoted Colonel in the Army (October). Promoted Regimental Colonel R.A. (December).

1795.—Promoted Major-General.

1796.—Appointed *Master-Gunner of England.*

1802.—Promoted Lieut.-General.

1808 (24th March).—Died at Woolwich; and was buried in St. Nicholas Churchyard, Plumstead, close to his still more extraordinary father, Lieut.-General Joseph Brome—not leaving any autobiography, and being yet unrepresented upon the walls of the R.A. Mess.

Lieut.-General *Thomas Davies.*

1777.—Sent to command at Fort Knipchausen *alias* Fort Washington.

1780.—Returned to England. A. de C. to Lord Amherst, with pay, until 1782.

1782.—Brevet-Major (June), Regimental Major (December). Remained A. de C. until promoted Lieut.-Col. in November, 1783.

1783.—Commanded the Field Train for the Camp at Coxheath, and also the Artillery on the posts and batteries of Kent County. Embarked in command of the Artillery for Gibraltar.

1785–6.—England.

1786.—Sent in command of the Artillery to the West Indies: thence to Canada. Commanded the Garrison of Canada.

1788–9.—Commanded the Garrison of Quebec.

1790–2.—England.

1793–6.—Plymouth, in command of R.A. as Lieut.-Colonel and Colonel.

1794.—Promoted Colonel in the Army (March). Promoted Regimental Colonel (August).

1796.—Promoted Major-General.

1799.—Appointed Colonel Commandant R.A.

1803.—Promoted Lieut.-General.

Observations on the foregoing.

Lieut.-General Davies flatters himself that all the above stated services are entitled to some merit, if not to some recompense and attention; are not small; and that he has on all occasions executed them with steadiness, fidelity,

Lieut.-General *Joseph Walton*.

To keep alive in the affections of the Regiment the record of services of this distinguished Gunner has thus devolved upon his unknown admirer and brother officer.

THE AUTHOR.

Lieut.-General *Thomas Davies*.

and honour—at least, much to the satisfaction of those by whom he was employed; that many of them have fallen to the lot of few, if any, especially without emolument or reward; and that he is the only officer in the Regiment who for such services has never received some recompense or emoluments for what they have done; that from the day he got his commission, to the present time, he has paid his house rent and taxes [1]; and that he has never received one shilling gratuity for any of these various services, except as Lieut.-Colonel and Colonel while on the command at Plymouth and as A. de C. to the Commander-in-Chief—although several of them were very laborious and expensive, particularly Coxheath, the West Indies, and Canada.

1812 (16th March).—Lieut.-General T. Davies died at Blackheath.—*R.H.M.*

[1] Only Field Officers were allowed married quarters formerly.

(To be Continued).

THE FRENCH SOUDAN

UP TO DATE.—NOVEMBER, 1893.

Compiled from the French accounts in "Le Temps" (with permission.)

BY

CAPTAIN S. P. OLIVER, *late* R.A.

PART I.

The French Soudan is that vast territory which comprises the upper valleys and basins drained by those great rivers the Niger and the Sénégal. To the west it is bounded by the French colony of Sénégal and to the south-west by Portuguese Guinea, by Fouta-Djalon—a dependency of the colony French Guinea—and the British colony of Sierra Leone. Towards the south the frontier of the French Soudan meets that of Liberia (the exact determination of the limits of this boundary is yet to be settled, whenever the convention between that country and the French Government may be carried out.) Due south lies the Ivory Coast, and to the south-east the British possessions of the Gold Coast. Towards the east, as also to the north the delimitations of the French Soudan are not yet defined and must long remain thus indefinable and uncertain. But a few years ago they did not extend beyond the Niger, but since the recent campaigns of Colonels Achinard, Combes and Humbert, they have been carried much further to the east and north. Indeed, a French military post is now established at Bandiagara, the capital of the Macina country; whilst to the north the French possession reaches the confines of the Sahara desert; so that the Soudan, at the present day, forms one of the most extensive and important of the French colonies. From Bakel on the Sénégal, to Bandiagara on the same line of latitude, 15° N., the distance extends over a thousand kilomètres. From Nioro on the edge of the northern desert, to Kissidougou on the Sierra Leone frontier, it is not less than 700 kilomètres.

The acquisition of this vast domain has been long and arduous, but the results are glorious; and the marine troops of our French neighbours have distinguished themselves by their steady and persevering intrepidity when encountering the forces of a fanatical enemy which

always outnumbered the small European expeditions during their unequal struggles by which they have gained possession of a wide and rich country.

The Chamber of Deputies will soon have presented to it, for its study and consideration, the projects which the Colonial Administrative Department has in preparation, for the consolidation of this extensive acquisition, the task of conquering which has occupied already some fifteen years of steadily progressing enterprise, in order to develope and improve the value of these immense territories by organised exploitation. It is needless to add that no colonisation proper by European immigrants is possible in this part of Africa. As soon as peace has been thoroughly established in this country, at present half ruined by the devastating wars which the powerful native chiefs have long waged among one another, and which, indeed, have resulted in French intervention, no doubt French and European merchants will be enabled to establish a profitable trade with the inhabitants throughout the French Soudan. But, of course, the accomplishment of this end will be dependent, in a great measure, on the means which the Colonial Department will adopt to hold in peaceful subjection the various and diverse tribes which people this country, and to work harmoniously to preserve the economical interests of the native peoples, as well as the sovereignty of France and the benefit of her traders. It is in order that the comprehension of these projects may be rendered clearer to our readers that the following description of the French situation in the Western Soudan has been compiled from the most authentic sources.

THE SOUDAN, FROM 1879 TO 1888.

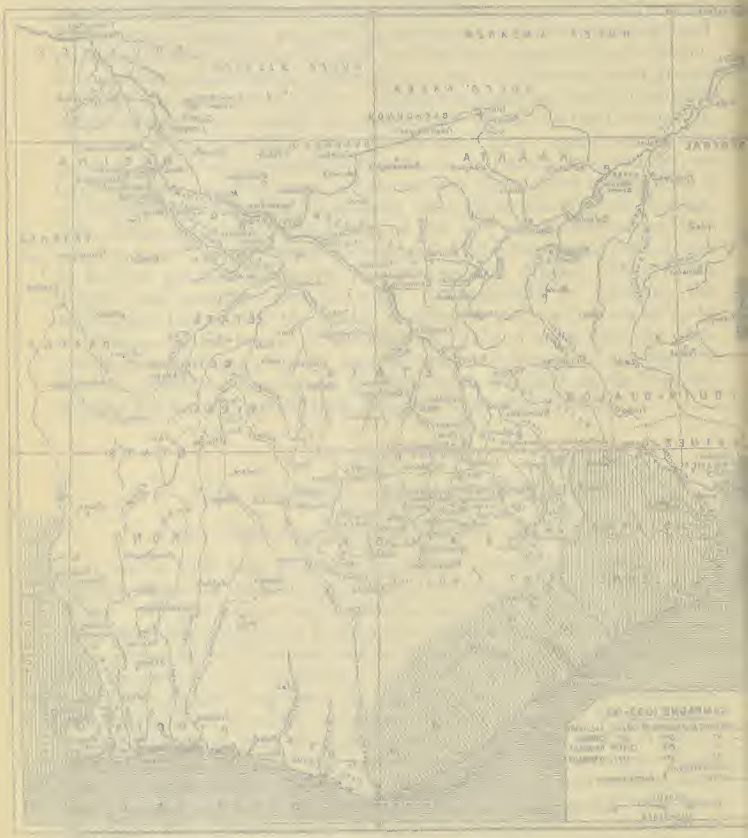
First Operations against Ahmadou and Samory.

It was in 1879 that France was induced to interest herself in these regions, then but little known, which are drained by the Sénégal and Niger. In that year, it may be recollected, M. de Freycinet formed the celebrated Trans-Saharan Commission, which was instructed to draw up a programme for the best means of pushing French interests inland and for carrying out exploration towards the Central Soudan.

A distinguished engineer, M. Duponchel, had already proposed the establishment of a railway across the Sahara desert, to bring Algeria in communication with the populations of the valley of the Niger, of Sokoto and of Bornou. But many good authorities, amongst others General Faidherbe, who had long governed Sénégal successfully, were much prejudiced in favour of another route, which would start from the point where the Sénégal ceases to be navigable, *i.e.*, the post of Médina, and traverse the interval between the upper waters of that river in a south-east direction to the higher navigable stream of the upper Niger at Bammako, some 300 miles or more. This project of General Faidherbe is fully explained in the instructions which he gave to Lieut. Mage (of the Imperial Navy) when, in 1864, he sent that explorer to reconnoitre the Upper Sénégal and the Niger: "The object,"

CARTE DU SOUDAN FRANÇAIS

Thorn, Lith. Woolwich



he wrote "will be to create, at the proper time whenever the orders to that effect may be given, a line of posts, at intervals of some thirty leagues between Médina and Bammako, or some other neighbouring locality which may appear more convenient to establish a commercial base and entrepôt on the Niger river."

Poor Lieut. Mage, who afterwards was drowned in a shipwreck off Cape Finistère, accomplished his mission in a remarkable manner. He fixed upon the village of Kita as one of the points where a convenient post might be established, and he returned to Saint Louis,[1] after having lived, under compulsion, at Ségou for more than two years, under the protection of Ahmadou, the son of the celebrated Mussulman chief El Hadj Omar (the ruler of the Soudan). The contemporary history of the Soudan is wholly involved in that of this powerful chieftain El Hadj Omar and his family, and it is necessary, in order to understand all that has been done in this country for the last fourteen years, to possess some little acquaintance with this dynasty of Toucouleur.

El Hadj Omar was a Toucouleur, that is to say, he belonged to that population which inhabits the Sénégalian Fouta, which race is a cross between the Peuhls and the people of the middle and upper Sénégal. Omar was born at Aloar, a village not far from the present French post of Podor (just above the delta of the Sénégal), and, as his name indicates, has made the pilgrimage to Mecca, on his return from whence he settled in Sénégambia, and fixed his residence in the Fouta-Djalon, where he soon acquired a high reputation as a marabout—fanatic saint or fakir. About 1848 he moved eastwards to Dinguiray (on the higher waters of the Niger), and there he began to assemble some of the "faithful" as military followers. When he had recruited a following strong enough, he constructed the fortress of Koundian, in the neighbourhood and on the left bank of the Bafing river (which is the highest tributary of the Sénégal), due north of Dinguiray, and half-way between that village and Médina, which might serve him as a base for his contemplated raids and conquests. Dinguiray is in some measure a vassalage of Fouta-Djalon, and Koundian belonged by right to Omar, being his property. Having completed his fortress, Omar at once commenced to summon the faithful to war against the unbeliever and proclaimed a "jehad." To his appeal all the available warriors of the neighbouring regions readily answered, and taking up their arms placed themselves under his command; and, in 1854, at the head of 12,000 combatants, he commenced his campaigns by conquering Bambouk and several independent provinces on the banks of the upper Sénégal. In less than three years the whole of that country situated between the middle Sénégal and the upper waters of the Niger had submitted to him, and he established himself at Nioro, the capital of Kaarta, the country which commands the commercial line projected by General Faidherbe between the French colony of Sénégal and the Niger river. Having attained to this high position, influence, and power so rapidly, Omar now believed himself strong enough to attack the French, who, at the instigation of General Faidherbe had by this time pushed for-

[1] Saint Louis, the capital town of the colony of Sénégal, near the southern mouth of the delta of that river, north of Cape de Verde.

ward their military outposts along the banks of the Sénégal, to facilitate the transit of the commerce between their colony and the interior of the Soudan. In April, 1857, the Hadji advanced to lay siege to the French post at Médina, then defended by Paul Holl with seven Europeans and some fifty Sénégal native troops and Laptots. After a siege of ninety-seven days Omar was obliged to retire repulsed, having been defeated in two encounters with a relief column despatched as soon as possible by Faidherbe, and the colony of Sénégal was thus saved from imminent destruction.

The line of posts previously projected by General Faidherbe was subsequently formed by Borgnis-Desbordes, but it was not occupied without considerable trouble. It was at first thought that the natives and chiefs might be conciliated by pacific overtures and missions; and indeed from previous experiences this appeared a feasible plan. But although the missions of Lieuts. Marly, Jacquemard and Monteil (made in 1879–80) along the lower and middle courses of the Sénégal succeeded perfectly well in this respect; and although Captain Gallièni met with an equal success in the higher Sénégal as far as the neighbourhood of Kita, the circumstances were not the same when this last officer reached the line of the watershed and approached the basin of the Niger. There he soon encountered some more barbarous populations of untameable attitude, and whose warriors were fiercely hostile to the French explorers at the instigation of the successors of Omar.

The unfavourable attitude of the Toucouleurs and the Bambarras was still more manifest when Ahmadou, Sultan of Ségou and of Nioro, the son and successor of Omar had interned the members of the Gallièni mission during ten months, at a distance of some forty kilomètres from Ségou. Ahmadou had inherited the largest portion of the empire founded by his father,[1] and his territories extended directly across the road which the French desired to trace between the Sénégal and the Niger. The Toucouleur chiefs, the councillors of Ahmadou, reminding him of the wars which Omar had waged against the French in Sénégal in the days of Faidherbe, urged him to resist. Ahmadou hesitated to embroil himself with the foreigners, but his hesitation came to an end when he learnt that Colonel Borgnis-Desbordes, pushing on in advance, had taken the Toucouleur village of Goubanko, after occupying the village of Kita, which the Malinka inhabitants, formerly subject to the Toucouleurs, had voluntarily submitted to the French protectorate.

The Sultan of Ségou, greatly alarmed, at once signed with Captain Gallièni, on the 21st March, 1881, a convention which gave to the French access to the Niger. Peace having been thus concluded with the Toucouleurs, it was only necessary to repress some signs of resistance exhibited by the Bambarras of the Niger valley in order to reach Bammako, where the French post was constructed in March, 1883.

Unfortunately, just at the very moment when all difficulty was thus surmounted on the line from Kayes to Bammako, along which was being constructed a section of the railway from Kayes to Bafoulabé, fresh complications arose towards the south.

[1] Tidiani, his brother, had the government of the kingdom of Macina, the last conquest of Omar, and Aguibou, another of his brothers, had that of Dinguiray, the home of the Toucouleur power.

One Samory, a warlike chief of Malinka origin, who had constituted a vast kingdom around Bissandougou, the capital of the province of Ouassoulou, had crossed the Niger, and was advancing towards the north with an imposing force. A native officer in the French Colonial Forces was sent to treat with the Malinka chief and proceeded to meet Samory; but the Almamy of Bissandougou received the French envoy, viz., Alakamessa, in such a manner, even menacing him with death, that the French troops under Colonel Borgnis-Desbordes at once became engaged with the contingents of Samory.

On the 27th February, 1882, Samory was beaten at Kéniera, and again at Oueyako on the 5th April, 1883, by Colonel Desbordes. At Kokoro, on the 13th of June, 1885, not only was he defeated by Commandant Combes, but his army was chased off the field and pursued with such vigour that his retreat became a veritable route, and the Malinka chief was barely able to continue the strife. However, it was only after the campaign of 1885–86, in which Lieut.-Colonel Frey crushed the troops of Malinkamory, one of his Lieutenants, at Fatako Djingo, that the Almamy of Ouassoulou requested for peace.

Renewed Intrigues of Ahmadou.

The treaty of 1886 with Samory marks the end of the first period of the French military operations in the Soudan. Having retreated to at least 200 kilomètres south of the furthest French outposts, and occupied with the reconstruction of his army, the Almamy of Bissandougou ceased for the time being to constitute a danger to the new French establishments. Samory was busily engaged in making devastating raids to the east and south of his states for the purpose of obtaining numbers of slaves which were necessary to procure food and arms for his troops. This treaty, in fact, was nothing more than a temporary suspension of hostilities; all the same it was of advantage to the French, inasmuch as it prevented the British from annexing to Sierra Leone the States of Samory. An agreement was actually signed by the British agents and the Almamy, but the French treaty of 1886 had the priority and the British Government readily recognised the French rights under the territorial arrangement of 1889.

Peace, being thus assured at the south of the French possession in the Soudan, had another consequence, and this was the calming of the warlike propensities of the Sultan of Ségou. Ahmadou incited by his followers, had, at the commencement of 1884, left his capital and possessions on the Niger to settle at Nioro in the Kaarta, where he found himself more at home and in touch with the Toucouleur populations of the Sénégalian Fouta, and in nearer contact with the French posts. A glance at the map will serve to show that, at Nioro, Ahmadou was better placed for making war than at Ségou. Thus combining their efforts Ahmadou and Samory could advantageously act against the line of the French posts, by simultaneous attacks from the north and from the south.

But the vigorous campaigns of Commandant Combes and of Colonel Frey having all but annihilated Samory at least for the time, Ahmadou resigned himself to remaining tranquil. And, still further, the senior

Commandant of the Marine Infantry, then Lieut.-Colonel Galliéni, took the opportunity of obtaining, easily enough, from the son of the Hadji Omar, a treaty by which his states were placed under the protectorate of France, in May, 1887. Experience has shown how much (or rather how little) dependence was to be placed in such treaties. Nevertheless they served their purpose, if not as lasting engagements, at least as a temporary truce. So far, indeed, that Colonel Galliéni was enabled to devote the campaigns of 1886–87 and of 1887–88 to disembarass both Sénégal and the Soudan from the followers of the false prophet Mahmadou-Lamine. Besides, this period of calm permitted the organisation of the colony now named the French Soudan to progress tranquilly; while the French influence was successfully propagated among the Bambarras tribes, who had been almost completely detached from the Toucouleur populations. In addition, the French engineers were able to proceed with the construction of the railway from Kayes to Bafoulabé, which was prolonged by a roadway as far as Diouleba at fifty kilomètres from Bafoulabé on the way to Badoumbé, and the village of Siguiri on the upper Niger was occupied. The establishment of this new post being all the more necessary because, by a fresh treaty obtained from Samory by Captain Peroz, the Almamy consented to abandon all his conquests on the left bank of the Tinkisso and on the left bank of the Niger, from the confluence of the Tinkisso (*i.e.*, at Siguiri) as far as Bammako.

Thanks to the peace which reigned in the Soudan the French Commander was able to push on his reconnaissances along the great river Niger itself. The gunboat *Niger*, launched at Bammako in May, 1884, had not been able in its voyage of exploration during 1885 to pass beyond the *marigot*[1] of Djenné, which places the Bani in communication with the Niger; and again Lieut. Davoust, commanding the gun-boat, was unable to stop at Ségou in this rapid journey. In 1887 Lieutenant Caron was more successful. He passed the *marigot* of Djenné and reached Mopti, whence he proceeded to pay a visit to Tidiani, the King of Macina, in his capital of Bandiagara. Next, descending the Niger, he arrived at Kabara the port of Timbuctoo, after having taken a series of hydrographical observations and soundings, which surveys were highly useful afterwards to his successor Lieut. Jaime, when he again descended the Niger as far as Korioumé, a village situated by the side of Kabara.

Besides, this peace enabled Captain Binger to prosecute his enterprising journey in the country encircled by the Niger, and also permitted the military reconnaissance across the the Fouta-Djalon by Captain Audéoud.

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1 "*Marigots.*"—"The Sénégal river, in the lower part of its course, has many lateral reservoirs; it is ramified, right and left, in numerous canals or tortuous lakes, branches of the delta which commence but which have no outlet: to these are given in Sénégal the name of '*marigots*,' employed also, but wrongly, for the tributaries running permanently, and for the shallow lagoons of the sea-coast. During the rainy season they relieve the flow of the river and thereby prevent overflowing."—(Elisée Reclus. *Nouvelle Géographie Universelle*, XII., Chapter II., La Sénégambri, p. 189).—The backwaters and lateral channels in the ramifications of the tributaries of the Niger, where they abound in the flat wide basin of that enormous system, are also thus termed *marigots* by the French.

The Campaigns of 1888 to 1891.

The general situation of the Soudan became considerably modified towards the end of the campaign of 1888-89. At first all happened to go right. The new commandant, Major Achinard of the Marine Artillery, had only to carry out the programme of his predecessor. He continued the construction of the railway from Kayes to Bafoulabé with its prolongation towards Badoumbé, and he sent Lieut. Jaime to make a second trip down the river to Timbuctoo. In the midst of these undertakings occurred the affair of Koundian.

Koundian is the fortress which the Hadji Omar had constructed on the banks of the Bafing river, previous to beginning his conquest of upper Sénégal and the upper Niger. The Toucouleurs had continued to occupy it although it was in the very heart of the French Soudan possessions (from this point to Bafoulabé it is not more than 80 kilomètres), and affairs would have remained quiet had it not been that the garrison claimed total independence, and moreover collected, for their own benefit, passage dues on the caravans, stopped the merchants and insisted on their paying a ransom before proceeding.

In the course of the year 1888, the garrison of Koundian were warned to put an end to these obstructions which they offered to commerce, but this warning remained unheeded, and it was duly notified to them that should they persist in these exactions, serious proceedings would be taken against them.

In spite of this the Toucouleurs continued their depredations and to the demand of their submission, which was addressed to them by Col. Achinard, they answered by menaces. All parleying or delay was out of the question, and Koundian was shelled and taken by assault after a stubborn resistance.

The fall of the old citadel of the Toucouleurs was made the occasion by the councillors of Ahmadou to exercise a pressure upon the son of the Hadji Omar, and to determine how to make war upon the French In truth, this war was brought about by intrigues between Abdoul Boubakar, a Toucouleur chief of the confederation of Fouta, and Samory, the former enemy of the French. Ahmadou now made his dispositions for engaging in a serious war with the French. He married all his daughters, in order to ensure the adhesion of the Toucouleur chiefs, because their marriages humoured their pride; and he consolidated his alliance with Abdoul Boubakar and Samory. The first undertook, with the Toucouleurs of Fouta, to attempt to cut the French communications with Sénégal; whilst from Nioro, from Ségou, and from Bissandougou separate columns were to operate simultaneously against the French posts on the Niger and upper Sénégal rivers.

Ahmadou Driven out of Ségou and Nioro.

Colonel Achinard at once comprehended that in order to disorganise thoroughly this triple alliance it was necessary to strike speedily at the centre, and to isolate Ahmadou from the Toucouleur states and from the valley of the Niger, by leaving him on one side at Nioro, whilst he was operating against Ségou. In this region, moreover, the populations were excited against the French; and a rising of the Bambarras

of the Beledougou district was to be apprehended—a rising which would have considerably increased the forces of the hostile tribes by a number of brave and resolute warriors.

It was on this account that the expeditionary column which Colonel Achinard organised, at the end of the year 1889, had Ségou for its objective destination. This town, which was defended by Madani, one of the brothers of Ahmadou, was taken on the 6th April, 1890, and its fall had such an impressive effect that the native populations of the ancient Bambarra kingdom of Ségou came from all sides to give in their submission. Colonel Achinard respected the kingdom of Ségou, but he declared the extinction of the Hadji Omar dynasty and gave the sceptre of the kingdom to a Bambarra, Bodian, one of those who had long adhered to the French. The Toucouleurs families asked to be allowed to quit the country and to return to Sénégal. This was granted them, and thus several thousand Toucouleurs who had reached the banks of the Niger, in the track of the conquests of the Hadji Omar, now commenced a retrograde exodus back to the Fouta of Sénégal. The displacement of such a large population was not, however, effected without some difficulty. As soon as some of their bands of men arrived in Sénégal, in the neighbourhood of districts occupied by the Toucouleurs of Kaarta, there were various disturbances and attempted raids which were pitilessly and severely repressed.

A French garrison remained at Ségou, an officer, Captain Underberg, was placed in charge as Resident, to control the acts of the new king—or chief—Bodian. Besides, it was decided that the anchorage of the gun-boats should be transferred from Koulikoro to Ségou, to afford the Resident the support of the crews on board the flotilla.

The expeditionary column returned from the Niger to upper Sénégal, where some serious movemements were reported among the Toucouleurs of Kaarta. In order to prevent Ahmadou going back towards Ségou Colonel Achinard, after two hours fighting, captured the fortress of Oussebougou, which commanded the road from Nioro to Ségou by way of Nyamina. Then, in order to stop the eventful march of the contingents of the Kaarta toward Kayes (the French base of operations throughout the Soudan), Lieut.-Colonel Achinard drove back the Toucouleurs who were operating towards the valley of the Sénégal, and made himself master of the fortress of Koniakary, which Ahmadou vainly endeavoured to retake during the following winter.

The rainy season coming on the campaign came to a termination for the time, but was re-opened in the middle of December, when, after two fights in which the Toucouleurs were driven back towards Nioro, the French troops entered, on the 1st January, 1891, into the capital of the Kaarta, which the Toucouleurs, headed by Ahmadou, had just abandoned. Two days afterwards the fugitives were surprised at Youri and utterly put to flight. The most notable of the chiefs fell, fighting to the last, whilst Ahmadou fled almost alone into the desert, whence he calculated on being able to regain Macina, where his brother Mounirou reigned. The fight at Youri rendered the taking of Nioro complete: the whole of the Kaarta made submission; and, as in the Ségou district, the Toucouleurs families asked permission to re-

turn to the Sénégal Fouta. The emigration on this occasion was duly carried out, and, as precautions were taken, no serious incident happened during the operations.

In this manner, within the space of a year, the two capitals of Ahmadou, Ségou and Nioro, had fallen into the hands of the French; and the populations, delivered from their oppressors, gladly accepted the authority of the victorious Europeans. For two years and a half the Kaarta has remained in tranquility. The Kaartankas, whom the Toucouleurs had carried off into slavery in the valley of the Niger, have returned to take the place of their ancient masters, and no breach of the peace has occurred.

It was not, however, so peaceful in the province of Ségou and the adjoining regions. It happened there that the accession to power of Bodian had placed in antagonism two Bambarra families, which had reigned at Ségou before the conquest of El Hadj Omar, that of the Massanis to which Bodian belonged, and that of the Diaras. Some few of this last-named family formed a conspiracy to massacre the French garrison at Ségou, and then to overthrow Bodian. The movement, however, did not succeed. Those of the Diaras who were compromised fled, and betook themselves to the south, in the Baninko, where a second rising occurred which, nevertheless, was soon repressed by one of the native agents of the French Government, Mademba, employed in the civil service of Sénégal, who had numerous relatives in this country. But this submission was of brief duration, and whilst Colonel Achinard was carrying on operations against Ahmadou in the Kaarta (as above related) all the Baninko again arose together with a part of Ségou proper. Bodian, old, and without great authority, was then assisting his ally Tieba, the Almamy of Sikasso, to attack the fortress of Kinian; and his troops, irritated at being led so far away, deserted and joined the rebels of the Baninko. Lieut. Hourst, commanding the gun-boat flotilla in the valley of the Bani (Mayel Balevel), whither it had proceeded to try and restore order, was forced to defend itself in Diéna, which the insurgents soon began to besiege. Under these conditions Colonel Achinard hastened to direct his column—leaving garrisons in the Kaarta—towards the Niger, which march was accomplished as far as Nyamina by the 18th February. Six days afterwards the blockade of Diéna was raised after a sharp fight. The losses of the insurgents were enormous, and the Baninko for the second time submitted to the French authority.

After this affair at Diéna the column returned to Nyamina. There the senior commandant gave the sceptre to Mademba, to whom was accorded the kingdom of Sansanding, formed of the territories which were possessed by Ségou on the left bank of the Niger, and which the *fama* Bodian, old and sick, was incapable of governing, together with his possessions on the right bank.

Renewal of Hostilities against Samory.

It was now the beginning of March, that is to say scarcely two months before the return of the rainy season. Yet in spite of this short interval of time at his disposal Colonel Achinard resolved to push

on with the admirable and seasoned troops which he had in hand, and to fall on his ancient enemy Samory, whose attitude gave cause for some disquietude.

There has been no little discussion on the subject of this commencement of hostilities against the Almamy of Bissandougou, and considerable criticism has been directed against the conditions and opportunity under which active operations were recommenced in this direction. Had he been left to himself Samory might have continued to remain at peace with the French. Thus, notwithstanding the invitations which he had received from Ahmadou, he had always remained on good terms with the French authorities. Certainly, when Captain Binger met him in 1888, at the siege of Sikasso, where he tried to conquer Tiéba, an ally of the French, he did not evince any great haste in executing his engagements, and even refused to acknowledge that hardy explorer. But it is necessary to take into consideration the character of these Africans, and the proof that Samory did not wish to make war against the French is that he concluded at Niako, on the 13th February, 1889, with Captain Bounardot, a treaty in which he abandoned all his possessions on the left bank of the Niger to the French. This agreement isolated the territories of Samory from those of the Fouta-Djalon and from Sierra Leone, enabling the French to open up a route from the upper Niger to French Guinea and the coast. Those who were interested in embroiling the French with the Almamy hastened to point out to that chief how the concessions he had made to the French would prevent his easily buying cattle from the Foutankas, and powder from the British traders of Sierra Leone. In consequence, Samory, within less than three months, sent back the treaty he had just signed. Steps were at once taken to induce him to reconsider his decision, and he was given to understand that war would be the result of such an insult to France. Nothing, however, came of these attempts, Samory listened to the council of those who advised him to resist; his *Sofas*[1] were well armed with rifles, and he prepared for war by now accepting the propositions of Ahmadou, with a view to simultaneous action.

Upon this Colonel Achinard determined at once to begin active operations as follows:—An expeditionary column marched out from Nyamina on the 8th March, 1891, and proceeding along the left bank of the Niger ascended to the neighbourhood of Siguiri. On the 2nd April, the French crossed the river, and on the 7th occupied Kankan, a stronghold of Samory, situated some 80 kilomètres from the Niger in the valley of the Milo, which the Almamy had shortly before abandoned after setting the place on fire.

Colonel Achinard, leaving a garrison here in order to construct a post, without delay, proceeded on up the valley of the Milo. On the the 8th April a fight, at which Samory himself was present, took place in the ravine of Kokouna, at some distance to the south of Kankan. Twelve or thirteen hundred Sofas were in position at this locality and the battle was hotly contested, the French losses being considerable. Nevertheless, the Africans were forced to beat a retreat, leaving on

[1] *Sofas*, *i.e.*, marabouts or dervishes, Mahomedan fanatics.

the field many Belgian breech-loading rifles, chassepôts, half-a-dozen "Gras" rifles of native manufacture, and quantities of cartridges. The following day another fight ensued, at the "marigot" of Diamanko, which placed the French in possession of Bissandougou, the most ancient residence of Samory, a town where the Malinka chieftain had started on his first campaign. Samory acted here in the same way he had done at Kankan, leaving only ruins behind him, having burnt everything.

Pursuit under these circumstances was rendered impossible and the campaign was therefore brought to an end for the season, with the intention of recommencing operations against Samory again a few months later, starting from Kankan as a base, where for the time being, two companies of tirailleurs under Captain Besançon remained to hold the post.

The Campaign of 1891–92.

Colonel Achinard having just served for three successive seasons in the Soudan, it fell to the turn of Lieut.-Colonel Humbert to continue the arduous task of carrying on the operations already commenced.

Samory had reformed his troops during the rainy season; from Sierra Leone, where the trade in arms was exceedingly brisk—the Brussels convention not having, so far, been put into execution—caravans transported into Ouassoulou, to the Almamy, hundreds of breech-loading and repeating rifles, with millions of cartridges; Samory, now stronger than ever, was well prepared to dispute, foot by foot, every advance by the French columns within his states.

Lieut.-Colonel Humbert reached Kayes on the 9th October, 1891. He first organised a scientific mission which, under the orders of the Commanding Engineer Marmier, was about to survey for a prolongation of the railway, from Bafoulabe as far as Kita and the Niger. Having made all arrangements for this civil work, he proceeded to organise his column which was concentrated at Kankan by the 6th January, 1892.

Operations against Samory.

On the 9th January the column set out on its march. It included a total of 1004 combatants, of whom 144 were Europeans, together with 2084 non-combatants and 338 animals.

The artillery was composed of four mountain guns of 80^{cm}; and there were 32 Lebel rifles, and 900 men were armed with "Gras" rifles. The French at first followed up the same route towards Sanankoro by which the former expedition had marched, and on the 11th January they first encountered Samory's troops, at the *marigot* of Sombiko. This affair was even more hotly contested than that at Diamanko in the previous April. The Africans had made a great progress in proficiency from a military point of view. Their bugle calls, identical with those of the French, sounding "Cease firing" or the "Assembly," were so close as even to deceive the French soldiers themselves. The audacity of Samory's men had also increased in proportion to the improvement of their armament.

However, the impetuosity and dash of the French tirailleurs soon

overcame this first show of resistance, they were not to be denied, and the Sofas soon fell back, only to reform at five kilomètres in the rear, at the *marigot* of Diamanko, where Colonel Achinard's men had before given them a lesson. Another more obstinate fight here took place. At the Sombiko the French lost only three tirailleurs killed and ten wounded, whilst 17,000 cartridges were expended. At the Diamanko, the fire of Samory's troops cost the French three Europeans killed (among them Sub-Lieutenant Mazerand), five Europeans wounded, and a score of natives *hors-de-combat*, of whom seven were killed. The troops of Samory expended more than 25,000 cartridges.

Samory did not attempt to defend his capital, which the French entered on the 12th January. Colonel Humbert put the town into an efficient state for defence and sent back escorts to bring up supplies from Kankan, for the country having been pillaged by the Sofas was unable to furnish grain or cattle. The enemy managed to threaten and attack these convoys, but it was necessary to push on in advance. Accordingly the column left Bissandougou on the 22nd to attack Sanankoro, whither Samory had fled. A series of fights ensued, on the 23rd at Ouassako, on the 24th at Famandougou, and again on the 25th at Baratoumbo, where the enemy attempted to make a most spirited resistance, and on the 26th the column occupied the two neighbouring villages of Samankora and Kérouané, or at least their sites, for Samory had almost entirely destroyed them.

The want of provisions, and the difficulty of procuring them, did not allow of Colonel Humbert's going further at the time. He established his troops in Kérouané, where the fortifications lately raised by Samory were still in existence, and he employed himself in getting into the post he had thus created, all the provisions and ammunition which the garrison would require for the coming rainy season. Numerous reconnaissances were made around Kérouané, and in this way it was learnt that Samory had collected a great quantity of matériel in a mountain called Toutou Kourou, whose approach presented considerable difficulties. The attack of this place occurred on the 14th February. The tirailleurs attacked the enemy with the bayonet; the Sofas fled, and the French took, in the magazines of Samory, 70,000 cartridges for repeating rifles, 60,000 empty metal cartridge cases and 25,000 kilogrammes of powder, without counting smaller war materials and stores. Among Almamy's baggage were found the Sévres vases and the bust of President Grévy, formerly presented to Samory.

This defeat had no effect on the Almamy, however great these losses of ammunition may have been to him. When Colonel Humbert quitted Kérouané on the 29th February, in order to return to Bissandougou for provisions and ammunition, he was attacked several times by bands of Sofas and had to fight twice, at the *marigot* of Aramout and at the village of Komakhana. The line of communication between Bissandougou and Kankan were likewise threatened, and here Lieut. Belleville was killed on the 20th January. On the 9th March, 1892, a convoy of supplies, protected by a fighting column, started from Bissandougou for Kérouané. In this second march to the south three engagements took place, two on the 10th at Fabala and at the nullah

of Bananko, and a more serious one at the nullah of Bécéka, when the 2,000 Sofas were in the field. In this encounter the French consumed 12,000 cartridges, killed a hundred Sofas, and took five repeating rifles. Colonel Humbert arrived at Kérouané on the 15th, returning on the 21st, leaving at this advanced post under the orders of Captain Wintemberger, two companies of tirailleurs and five mountain guns. The return from Kérouané to Bissandougou was only marked by an encounter with a band of Sofas at the nullah of Bananko. One company was left in garrison at Bissandougou with three mountain guns, and by the 19th April the column had got back to Siguiri.

Judging matters, especially colonial matters, by mere appearances, it is clearly evident says the French chronicler, that one would be disposed to say that the results of the 1891–92 campaign were not brilliant. In fact, the expeditionary column did not get the best of Samory. The Sofas were still holding the country, in spite of the reserves at Toutou-Kourou, and the efforts made in the valley of the Milo only succeeded in carring the base of military operations 80 kilomètres further to the south. Moreover, as soon as Colonel Humbert had brought his column back towards Sénégal the little garrison at Kérouané found itself blockaded, its communications with Kankan intercepted and the commandant of the post, Captain Wintemberger, was reduced to sending out constantly little expeditions, in order to surprise the posts of the Sofas so as to widen the circle of their investment. In one of these *coups de main*, on the 1st April, 1892, Samory was very nearly made prisoner; the Almamy was only able to escape thanks to the devotion of one of his Sofas, who in their resistance killed Lieut. Biétrix.

Certainly such were the facts, but it is right to add that the moral effect produced upon Samory had been considerable. The Almamy of Ouassoulou was not the pusillanimous Ahmadou. He was a very bold and brave warrior. He had constantly been present in person, believing that the magazine rifles and the military education which he had given—or that his friends have had given—to his troops, would enable him to hold his own against the French, and repulse them. His hopes have now vanished. No step in advance made by the French has ever been drawn back, as he had been taught to believe would have been the case. The French posts, supporting one another, stretch from Kita to Niagassola and Siguiri, to Kankan, and their Residencies of Bissandougou and of Kérouané are occupied firmly by French garrisons. Evidently he still keeps his troops in hand; whilst the native populations come in thousands to settle around the newly-established French posts, happy in being delivered from the razzias of their savage oppressors, the Sofas nevertheless remain faithful to him.

All the same, although the Sofas have not yet deserted from him, possibly because Samory has in his possession their families, as guarantees of their fidelity, it is certain that they are completely demoralised. The heavy and destructive fire of the column had caused tremendous slaughter among them. Among the thousands of cartridges expended a large proportion took effect, and independently of the great number of dead, many more of the Sofas were seriously wounded. The bullets of the Lebel rifle especially terrified them. Colonel Humbert only had

some thirty of these weapons—few enough. Nevertheless, in the hands of expert marksmen, they produced wonderful results. Thus when the Sofas advanced under cover, on the left bank of the Milo, in order to open fire on the garrisons of Sanankoro and of Kérouané, they believed themselves wholly sheltered from the reach and out of range of the French projectiles behind the huge timber trees, often hollow within. The bullets of small calibre were capable of piercing through these natural obstacles, and many Sofas were killed by bullets passing through the trunks of the trees, to their great amazement and terror.

This campaign of 1891–92, therefore, had its due effect; it prepared the ground for the ensuing campaign which, as will be seen presently, proved both brilliant and profitable, but which owed its success and results, in a great measure, to the profound demoralisation created by these preliminary operations, which penetrated through the ranks of Samory's army. This is born witness to by officers who took part in these affairs, and who were well capable of judging of the value of the campaign.

(*To be continued.*)

NOTE ON THE CORRECTION

OF

ARTILLERY FIRE.

BY

MAJOR P. A. MACMAHON, R.A.

The question I propose to discuss here is as follows:—What is the best method of handling a single gun so that there may be the best possible chance of hitting an object (at first considered to be fixed) at a known or unknown range?

Artillerymen frequently have to fire at a fixed object, and it may, or may not, be convenient to obtain the range by a range-finder. In the former case, the range having been found, the gun may be laid for the range, and the projectile may, or may not, strike the object. If the object be sufficiently small the first shot will probably not be a hit. The reasons for this are clear; the range-finder may be at fault; the powder charge, or the projectile, or both, may be slightly abnormal; the gun-layer may not be sufficiently well-trained; the gun or its mounting may be defective; the climatic conditions may be extraordinary; and so on.

Supposing lateral errors to be eliminated, if the gun were laid at the ranges indicated by the range-finder for a large number of shots, the points of impact would form a group of points, more or less scattered, along the line of fire; the average range obtained would be a point called the centre of impact, and the density of the points of impact on the ground in the neighbourhood of the centre of impact would approximately obey the law known as the "Law of Frequency." The nearer the points to the centre of impact the denser will they be.

The centre of impact should coincide with the object if perfect shooting is to be possible. The gun will be laid at the correct elevation if the result of a large number of shots is the production of a group of points of impact whose centre coincides with the object. The group will be more or less scattered according to the accuracy of the gun as measured by the true dimension of its 50 per cent. zone for the range. If the gun be perfectly laid, the percentage of hits depends entirely upon the size of the object, and an object could be so designed as to receive any desired percentage of hits.

It is convenient to suppose that the object is a point on the range at a distance x yards from the gun. The artilleryman desires in the shortest space of time to arrive at the elevation he must give the gun

so that the centre of the group of points obtained by constantly firing at that elevation may be, as near as possible, at the object.

The case in which the range is not found by a range-finder does not differ materially, The artilleryman, in fact, constitutes himself the range-finder, and estimates the range to the best of his ability. The difference is merely that between a good and an indifferent range-finder, and the principles explained below apply with equal force to both.

The range having been estimated, by the best means at disposal, at r yards, the gun is laid for the range. The point of impact obtained may be any one of the scattered group of points that would be obtained if the gun were fired a larger number of times at this range. This point, however, is more likely to be that point which will ultimately be the centre of impact than any other point of the group. The reason is that in the immediate neighbourhood of the centre of impact the points of impact are denser than they are anywhere else. The probability that the first shot strikes at the ultimate centre of impact is not great, but only greater than the probability of its striking at any other point.

Suppose this first shot to strike p_1 yards over the object (where observe that p_1 may be negative and that the meaning then is that the shot strikes so many yards short of the object) so that, the gun being laid for a range r, the actual range obtained is $x + p_1$. The centre of impact for the gun as laid is more likely to be $x + p_1$ yards from the gun than at any other point that can be assigned.

The wisest course, in view of the subsequent shooting, is to lay the gun for the second shot for a range of $r - p_1$ yards, since, under this circumstance, the centre of impact of the gun, as laid for the second shot, is more likely to be at the object (x yards from the gun) than at any other point that can be assigned along the range. In other words, the best chance of obtaining a range of x yards is to lay the gun for a range of $r - p_1$ yards.

The second shot is fired, with the above correction, and the result is, suppose, that the shot strikes p_2 yards over (observe again that p_2 may be negative). A range of $x + p_2$ yards has been obtained by laying the gun for a range of $r - p_1$ yards. Had this second shot been fired for a range of r yards we may assume, without sensible error, that the range obtained would have been

$$x + p_1 + p_2 \text{ yards.}$$

Virtually we have now the result of two shots fired for a range of r yards and the mean ranges obtained has been

$$\tfrac{1}{2}\,(x + p_1 + x + p_1 + p_2)$$
$$= x + p_1 + \tfrac{1}{2}\,p_2 \text{ yards.}$$

As a result of the firing of the two shots we may say that the centre of impact of projectiles fired for a range of r yards is more likely to be at a point

$$x + p_1 + \tfrac{1}{2}\,p_2 \text{ yards}$$

from the gun than at any other point that can be assigned along the range.

The third shot should, therefore, be fired for a range of

$$r - p_1 - \tfrac{1}{2} p_2 \text{ yards},$$

since, then, the centre of impact of shots so fired is more likely to be at the object (x yards from the gun) than at any other point that can be assigned along the range.

Thus the correction for the third shot is

$$- \tfrac{1}{2} p_2 \text{ yards},$$

which is, numerically, $\frac{1}{2}$ of the actual error of the second shot.

The third shot is fired with this correction (that is for a range of $r - p_1 - \frac{1}{2} p_2$ yards) and, suppose, it strikes p_3 yards over. We may assume, as before, that if it had been fired for a range of r yards the shot would have struck

$$p_1 + \tfrac{1}{2} p_2 + p_3 \text{ yards over},$$

or, the same thing, that the range obtained would have been

$$x + p_1 + \tfrac{1}{2} p_2 + p_3 \text{ yards}.$$

Thus, virtually, we have before us the results of three shots fired for the range r; the mean of these is

$$\tfrac{1}{3} (x + p_1 + x + p_1 + p_2 + x + p_1 + \tfrac{1}{2} p_2 + p_3) \text{ yards}$$
$$= x + p_1 + \tfrac{1}{2} p_2 + \tfrac{1}{3} p_3 \text{ yards}.$$

The point which is at this distance from the gun is now more likely to be the centre of impact of shots fired for the range r than is any other point that can be assigned along the range.

Accordingly the fourth shot should be fired for a range

$$r - p_1 - \tfrac{1}{2} p_2 - \tfrac{1}{3} p_3 \text{ yards},$$

or, the same thing, the correction for the fourth shot should be

$$- \tfrac{1}{3} p_3 \text{ yards},$$

which is, numerically, $\frac{1}{3}$ of the actual error of the third shot.

Proceeding in this way it is not difficult to see that the correction for the n^{th} shot should be

$$- \frac{1}{n-1} p_{n-1} \text{ yards},$$

which is, numerically, $\dfrac{1}{n-1}$ of the actual error of the $(n-1)^{\text{th}}$ shot.

To establish the law, assume it to hold for the first $n - 1$ shots.

Virtually we have before us the results of $n - 1$ shots fired for a range r.

The mean of these has been

$$\frac{1}{n-1} \Big\{ (x + p_1) + (x + p_1 + p_2) + (x + p_1 + \tfrac{1}{2} p_2 + p_3)$$
$$+ (x + p_1 + \tfrac{1}{2} p_2 + \tfrac{1}{3} p_3 + p_4) + \ldots\ldots$$
$$\ldots + (x + p_1 + \tfrac{1}{2} p_2 + \ldots + \frac{1}{n-2} p_{n-2} + p_{n-1}) \Big\} \text{yards}.$$

$$= \frac{1}{n-1} \Big[(n-1)\, x + (n-1)\, p_1 + \Big\{ 1 + \frac{n-3}{2} \Big\} p_2 + \Big\{ 1 + \frac{n-4}{3} \Big\} p_3$$

$$+ \ldots . + \left\{1 + \frac{1}{n-2}\right\} p_{n-2} + p_{n-1} \Big]$$

$$= \frac{1}{n-1} \Big\{ (n-1)\, x + (n-1)\, p_1 + \frac{n-1}{2} p_2 + \frac{n-1}{3} p_3 + \ldots .$$

$$\ldots + \frac{n-1}{n-2} p_{n-2} + p_{n-1} \Big\}$$

$$= x + p_1 + \tfrac{1}{2} p_2 + \tfrac{1}{3} p_3 + \ldots + \frac{1}{n-2} p_{n-2} + \frac{1}{n-1} p_{n-1} \text{ yards.}$$

Accordingly the n^{th} shot should be fired for a range of

$$r - p_1 - \tfrac{1}{2} p_2 - \tfrac{1}{3} p_3 - \ldots . - \frac{1}{n-2} p_{n-2} - \frac{1}{n-1} p_{n-1} \text{ yards.}$$

But, from the assumption made, the $(n-1)^{\text{th}}$ shot was fired for a range of

$$r - p_1 - \tfrac{1}{2} p_2 - \tfrac{1}{3} p_3 - \ldots . - \frac{1}{n-2} p_{n-2} \text{ yards;}$$

hence the correction for the n^{th} shot is

$$- \frac{1}{n-1} p_{n-1};$$

or, assuming the law to hold in regard to the corrections to be applied to the first $n-1$ shots, the law also holds in regard to the correction to be applied to the n^{th} shot. Since the law is certainly true for small values of n it is thus shewn to be true universally.

When n is large, the distance

$$x + p_1 + \tfrac{1}{2} p_2 + \ldots + \frac{1}{n} p_n$$

approximates closely to the range appertaining to the gun when it is laid for a range r. Suppose this range to be r_1 so that r_1 is the distance from the gun of the centre of impact when a large number of shots are fired for the range r, then

$$x = r_1 - p_1 - \tfrac{1}{2} p_2 - \ldots . - \frac{1}{n} p_n$$

and we see that if $x = r_1$ or the gun was correctly laid for the first shot,

$$p_1 + \tfrac{1}{2} p_2 + \ldots + \frac{1}{n} p_n,$$

or the sum of the successive corrections, is zero.

It is important to remark that, with this systematic method of correction of fire, the corrections become of less and less importance as the firing proceeds; this is, indeed, the natural result of any sound method of correcting fire. The gun may be regarded as oscillating about its trunnions, the amplitude of the oscillations becoming smaller and smaller, and gradually settling down at the elevation which will cause the object to be at the centre of its fire.

If the target be moving so that the range is practically constant the above principles apply without alteration.

If the target be moving so as to diminish the range by k yards

during the interval of firing (where k may be negative) the *diminishing* corrections of range for the 1st 2nd, 3rd, ... n^{th} shots should be

$$k + p_1$$
$$k + \tfrac{1}{2}\,p_2$$
$$k + \tfrac{1}{3}\,p_3$$
$$\cdot$$
$$\cdot$$
$$\cdot$$
$$\cdot$$
$$k + \frac{1}{n-1}\,p_{n-1} \text{ yards}$$

when p_{n-1} is the over error of the $(n-1)^{\text{th}}$ shot. In some cases it is considered preferable to secure over rather than under errors. The effect of this is merely to advance the desired centre of impact beyond the target a small distance e, thus making the corrections successively

$$p_1 - e$$
$$\tfrac{1}{2}\,(p_2 - e)$$
$$\tfrac{1}{3}\,(p_3 - e)$$
$$\cdot$$
$$\cdot$$
$$\cdot$$
$$\cdot$$
$$\frac{1}{n-1}\,(p_{n-1} - e).$$

Guns in the service cannot in general be corrected for smaller distances than 25 yards of range, so that the above perfect system is impossible of perfect execution. However, a knowledge of the principles applicable to a weapon with which it is possible to carry out the theoretically perfect corrections cannot fail to be of advantage in the study of an imperfect weapon.

For example, p_{n-1} being the actual error of the $(n-1^{\text{th}})$ shot, the correction for the n^{th} shot is theoretically $-\frac{1}{n-1}\,p_{n-1}$.

TABLE FOR CORRECTION OF FIRE.

Correction for	0	25	50	75	100	125	150	yds.
Error of— 1st shot	<12½	<12½ >37½	>37½ <62½	>62½ <87½	>87½ <112½	>112½ <137½	>137½ <162½	yds.
2nd „	<25	<25 >75	>75 <125	>125 <175	—	—	—	—
3rd „	<37½	<37½ >112½	>112½ <187½	—	—	—	—	—
4th „	<50	<50 >150	—	—	—	—	—	—
5th „	<62½	<62½ >187½	—	—	—	—	—	—
6th „	<75	<75 >225	—	—	—	—	—	—
7th „	<87½	—	—	—	—	—	—	—

When $\frac{1}{n-1} p_{n-1}$ is less than $12\frac{1}{2}$ yards,

or p_{n-1} less than $\frac{25}{2}(n-1)$ yards

it is not possible to make any correction of the fire for the n^{th} shot.

When $\frac{1}{n-1} p_{n-1} > \frac{25}{2}$ yards and $< \frac{75}{2}$ yards,

or $p_{n-1} > \frac{25}{2}(n-1)$ " " $< \frac{75}{2}(n-1)$ yards

the proper correction is for

-25 yards,

and so on.

The annexed table for use with service guns has been drawn out on the lines of this paper.

To explain, we see in the third row, second column, $> 37\frac{1}{2} < 112\frac{1}{2}$, and at the head of the second column is the number 25. The meaning is that if the error of the 3rd shot is anything between $37\frac{1}{2}$ and $112\frac{1}{2}$ yards, the correction for the 4th shot is 25 yards. Similarly the table shows that the error of the 4th shot being less than 50 yards, no correction should be made.

Practically it will be found that the gun settles down, after four or five shots, and that no further correction will be necessary.

OKEHAMPTON EXPERIENCES, 1893.

BY

MAJOR A. J. HUGHES, R.A.

(A Lecture delivered at the Royal Artillery Institution, 12th October, 1893.)

COLONEL W. S. CURZON, R.A., IN THE CHAIR.

The Chairman—Gentlemen, I do not think I need introduce Major Hughes to you, because you all know him. I will ask him, therefore, to kindly give us his lecture.

Gentlemen—I have much pleasure in responding to the kind invitation to deliver this year's lecture on Okehampton Experiences. I hope, though many of the details are rather dry, that at least some of them may be of interest and lead to discussion.

The points brought to notice are chiefly taken from the daily criticisms, held by the Camp Commandant, and are those which at the time seemed to raise most interest and comment.

I have given examples in order to show how the various points arose, and not with any intention of exposing faults. The practice was conducted on much the same lines as that of last year; targets and conditions of the Battery Service Practice being as nearly as possible alike.

The orders given to Battery Commanders were better worded and more continuous, so as to try and avoid the delays between cease firing, limbering up, and action at the next position. Thus, when firing was going on at one position, the order "prepare to advance" was handed to the Battery Commander, so that, as soon as "cease firing" was given, the battery could limber up and move off at once to the next position.

The average time, taken from a large number of series, between cease firing and moving off was 3 min. 30 sec. This appears rather long; on occasions it took as much as 6 min., and on others only about 1; probably under ordinary practice conditions a battery should be able to move in about 2 min. after the order "cease firing" has been given. The great causes of delay were fuzing shell and filling magazines. When No. 6 kept sufficient rounds fuzed to fill the magazines it did not take long to load and fill them. The supply worked best in those batteries whose No. 6's had orders to fuze a shell whenever their gun fired; they thus always had the right number fuzed. This method was rendered easy at Okehampton, as every shrapnel had a time and percussion fuze; the only difficulty arising when common were required.

If one cannot carry fuzed shell in the limber-boxes, some quicker method of fuzing them is necessary: perhaps an interrupted thread on the fuze hole and fuze might answer, the plug still having a few complete threads to keep it tight.

The necessity for orders being correctly worded and given as commands only, *not* supplemented by verbal instructions, was much noticed. A common example will perhaps best explain my meaning. One often heard "cease firing" given, and then, after a pause, "fire off the loaded guns," upon which a kind of irregular fire took place. The supplementary instruction "fire off the loaded guns" was unnecessary and only confusing to the Section Commanders, since it raised a doubt in their minds as to what the drill really was. Consequently, when the order "cease firing" was given correctly to Section Commanders, accustomed to the verbal addition, they seemed at a loss how to act, and often inquired what was to be done with their loaded guns. One rather curious incident occurred owing, probably, to the want of a definite order in the drill:—

A Battery Commander wished to advance from one position to another, prepared for action, but with unloaded guns. He very naturally gave "do not load," and then "prepare to advance." One Section Commander either did not hear the former, or considered that the "prepare to advance" cancelled it, and loaded; being rather supported in this latter view by the hand-book, which lays it down that, on "cease firing" preceded by "prepare to advance" being given, guns are to be loaded without any definite order from the Battery Commander.

To prevent this occurring again, as the Battery Commander must say whether he wishes percussion shrapnel or common, it has been suggested that, if he wishes the guns loaded, he should give "cease firing—common, load," in the same way as he gives "prepare for action—common, load."

An order to replace ammunition was also thought necessary for the practice ground, and has been suggested.

With reference to this necessity for exact orders, the Commander-in-Chief in India, speaking at the close of the Simla Rifle Meeting, remarked, "There is another point to which I wish to direct particular attention, that is, the absolute necessity for accurate words of command." And, again, "I cannot, therefore, too strongly impress upon you the need of accustoming yourselves to give accurate, decisive, and well timed words of command, and educating yourselves up to it in peace time."

Reconnoitring Positions.

To try and give as much practice in reconnoitring as possible, targets were not pointed out to Battery Commanders. The orders given them contained the target (such as a column, line of standing or kneeling dummies), the direction they should take, and the approximate position; the latter directions being given on the suggestion of the Officer Commanding 2nd Division by points of the compass.

The necessity for carefully studying the directions given before

advancing showed itself on several occasions. More than once batteries were brought into action against a line of kneeling dummies, instead of a column, in consequence of the former being more clearly visible. Again, a battery, ordered to take up a position on the north side of a screen, was brought into action on the south side of it. It seems a small matter, especially as both positions appeared equally good, still, by not going as ordered, the line of fire was thrown too much across the range for safety; on service, such a deviation might upset the dispositions of the Brigade Division Commander. There seemed rather a dislike on the part of Brigade Division and Battery Commanders to leave their commands and advance well ahead to reconnoitre the next position. Consequently it happened on several occasions that a commander arrived at the position only just ahead of his command, and either had to delay the batteries by halting them until he completed his reconnaissance, or let them come on and rather trust to chance for their positions.

Occupation of Positions.

The two methods (generally called the "deliberate" and "direct") seemed to have worked well, and the principles regulating their employment appear to be getting thoroughly grasped; batteries being rarely brought into action by the method not suited to the occasion.

In the "deliberate," the average time of a large number of series, from the halt under cover to the first gun, was 3 min. 36 sec.

On a few occasions it was employed against a line of 80 standing dummies, representing advancing infantry, the range being about 1900 yds., and the target as a rule plainly visible. This was clearly against the spirit of the drill. The advance to the firing position was certainly covered, but the position itself was so open that the infantry would have been bound to see the gun-layers, and thus would have had about $3\frac{1}{2}$ minutes warning of the appearance of the battery, whereas, when the "direct" method was employed they only received about 45 sec. notice before the first gun. Further, the target being plainly visible, nothing could be gained by having out Section Commanders and gun-layers.

On the other hand, the "direct" method was sometimes employed at an indistinct target, at a fairly long range (2500), generally with disastrous results. On one of these occasions a battery was in action for 7 minutes, and on two others for nearly 4 minutes, without firing, whilst on a fourth, the range party were the sufferers.

One day at Brigade Practice the Section Commanders of the outer battery had over 400 yards to go; this shows that when the "deliberate" method is employed at Brigade Practice it is most essential for the batteries to be halted in line parallel to the firing position.

It is perhaps worthy of note that most Battery Commanders employed the "deliberate" method at the second series of the Competitive, some even at the third, probably with the hope of gaining some advantage in better dressing, quicker first gun, &c.

Employing it in the third series, although not actually debarred by the regulations of the competition, is so clearly against the drill that

some considered that marks should have been deducted for using it.

Pointing Out the Target.

The old difficulty of making Section Commanders and gun-layers pick up an indistinct target by word of mouth was often very apparent.

A few Battery Commanders used pointers, as recommended in 1890. They certainly made it much quicker, but they were not generally liked or used, it being considered that, as they are only needed on special occasions, it is not worth while to carry an extra store. Now, however, that batteries are to carry pickets for auxiliary laying points, this objection can easily be overcome; a very slight cross head to the pickets would make them serve as pointers should one be required.

When the direct occupation was employed, the quickest and surest way was for the Battery Commander to indicate the target to the nearest Section Commander only (if necessary pointing the nearest gun), and then let the centre Section Commander obtain it from him, and so on. By thus making one Section Commander receive it from his neighbour, the rush of officers through the battery was prevented, and fire commenced directly the Section Commander nearest the Battery Commander knew the target. The other Section Commanders always had plenty of time to pick it up before their turn came to fire. It was, as a rule, easy to find the target by observing the pitch of the first round, and when this failed, the second almost always indicated it.

Rate of Fire.

Deductions as to rate of fire, made from the ordinary Service Practice, are often rather misleading: on the practice ground, series are so short that the rate often depends more on the ability of the Battery Commander to find the range and fuze quickly than on the working power of the battery.

The experiment, however, on the 29th of June, when from 50 to 60 rounds were fired in each series, affords a fair test. On this date the rate at standing targets varied from 6 rounds a minute to 2·6, the average being 4·2.

This seems to show that, though on occasions 6 rounds a minute can be maintained for some time, the average for a long period will only be 4, which agrees very accurately with foreign estimates, the German regulations laying down 4 rounds a minute for a 6-gun battery.

For a short time at the cavalry target, on the 29th of June, the rate ran up to 13·5; the average at Okehampton of the 6-gun batteries being 9·8.

Ranging.

Ranging at a near infantry target was often very slow, this was especially the case when finding the length of fuze, most Battery Commanders waiting to observe the first pair before giving out the next length. In some batteries the Commander gave out at once three lengths, one for each section. At a short range one of the three should be right, the others would probably do some damage, and the Com-

mander could keep to whichever appeared best. This plan certainly answered very well, it is quick, and has the great merit of extreme simplicity, and, further, requires no new drill or knowledge from the battery.

Ranging at short ranges by elevating wheel, without the Hammant indicator, was to have been tried by several batteries; it, however, only had a partial trial by one of the batteries of the last division. The wheels were marked in plain divisions, each division representing 50 yards at a range of 1500 yards. It seemed to work well, and is, I believe, to be further tried.

The use of range and fuze cards seems dying out, some Battery Commanders not even requiring them when working in degrees and minutes. This probably will become general when all sights and clinometers are marked in yards.

The time taken to switch the fire from one target to another varied from 3 minutes to about 1; here again the value of clear definite orders was very apparent.

The chief thing in switching the fire was not to point out the new target to the battery at large until the guns were loaded with percussion shell and could turn on at once.

The change was from a near to a far target, whilst the battery was firing time shrapnel, ordinary fire, at the former; the simplest order was therefore, "percussion shrapnel, load," and then, as soon as the fire came round to the first gun, loaded with percussion shell, "slow fire, range and target." It seems perhaps wrong not pointing out the target first, but when this happened there was always delay as to what was to be done with loaded guns, and the change certainly worked smoothest and quickest when the above orders were adhered to.

Of course there is no difficulty when the change is from a far to a near, the only order required being, "slow fire, range and target."

The quickest change at Brigade Practice occupied 3 minutes, time being taken from the receipt of order by Brigade Division Commander, until each battery had fired one round on the new target: on some occasions as many as 9 minutes elapsed before a round was fired at the new target. On one Brigade day the target for one position consisted of a 6 and 4-gun battery. After the Brigade Division had been in action for some time, the Officer Commanding was informed, that one of the batteries had limbered up and advanced. This naturally led to fire being concentrated on the remaining battery; when the fire appeared settled three 6 foot targets, supposed to represent a battery at a closer range, appeared, and after a time were turned off again. The latter remained visible, on an average for 10 minutes, and in that time concentration was attained twice, out of the four times it was attempted.

The method of working a switch by appearing and disappearing targets, instead of simply giving the order to change, is a great improvement. It certainly has the disadvantage that the rope is sometimes cut and then they cannot be turned off, but when this happens there is always the order to fall back upon. It would be an advantage also, if some system of puffs could be arranged so as to draw the

attention of the Commander to the new target. In Russia, I believe, the orders are worked by means of different coloured flags, hoisted near each target; a Staff Officer with the batteries has a corresponding set of flags, and hoists them according to the scheme; the batteries being allowed to fire on those targets which exhibit the same flags as held up by the Staff Officer.

Distribution.

One heard a good deal about "distribution" and "concentration" at Okehampton this year. The subject has been so well thrashed out by Colonel Maurice and Major White, and finally summed up by Captain Granet, that there should be no more danger of considering dispersion and distribution to be one and the same; nor should there be any further chance of anyone thinking, that the advocates for "distribution" desire to discard "concentration" against a tactical point, the value of which is recognised by all.

These misunderstandings having been removed, the argument has centred round the artillery duel, when the position and forces are equal. On this question the Brigade Division and Battery Commanders, who were at Okehampton this year, were almost solid in favour of "distribution," battery to battery; the general opinion being:—That on opening fire each battery should start on the one opposite, reporting range and fuze when found to the Officer Commanding the Brigade Division; the fire should be left "distributed," but on occasions may be "concentrated" should the Officer Commanding Brigade Division consider it necessary.

On the minor question of "battery distribution," there was much greater diversity of opinion, about half being for gun to gun and the remainder for concentrating on the centre section, these latter holding that, owing to the natural errors of laying, this method would result in a fairly concentrated fire being obtained on the centre four guns, and that, if these were knocked out of time, the flank guns should not do much damage.

This method of brigade distribution and battery concentration certainly appears to have some claim to consideration, as by it the same concentration on individual guns is obtained as by concentrating three batteries on one, and yet no battery (fire unit) is left unmolested.

In Series II. and III. of the Competitive the distribution was frequently at fault, and at Okehampton was the reason of small scores as often as errors of range. On several occasions there were sections of 5 and 6 neighbouring dummies on the flanks untouched. If the target (omitting the centre dummy) is divided into 4 sections of 11 each, the proportion of dummies disabled in the centre sections to those disabled in the outer was as 4 is to 3.

Fire from Behind Cover.

In the Service Practice there was one series fired from under cover. The ground sloped gently to the rear, and was such that either one or two pickets could be used. On the whole, the system of the gun-layers planting two pickets and then bringing the guns into action

on them answered best; it was quicker and better cover was obtained, because, when one picket was used, the guns had to be advanced so near the crest that the heads of the detachment could generally be seen from the target.

The times varied greatly, the quickest (I timed) from the Battery Commander seeing the target to 1st round being 6 min. (only 1 min. 20 sec. from action to 1st gun), and the longest over 13 min.

The chief cause of delay was the indecision of the gun-layers as to where the front picket was to be planted, and the rapidity was greatly increased when the Battery Commander himself ordered the position for the front picket of the gun on the directing flank; the remaining gun-layers planting theirs in a fairly dressed line and at somewhat reduced intervals. When once started the fire was very regular and rapid; in fact, considerably better than when using sight laying: the mean error after ranging of one battery that used Scott's sight clinometer, marked in yards, was only 6 yards, 25 yards covering the pitch of 14 out of 16 rounds. Another battery reached the high rate of 5·8 rounds a minute, the average being 4·01 rounds.

I cannot help thinking that very good results, better even than with sight laying, might often be obtained at visible targets by using clinometer elevation, the laying being done by the No. 1 from the end of the handspike; provided, of course, that the clinometer is a good one, marked in yards, with an adjustable zero, and that the clinometer plane be placed so that a man can elevate and watch the bubble at the same time.

Some trouble was experienced by Battery Commanders, owing to the fact that the length of the first fuze should be that for the range-taker's range and not for the clinometer elevation; the wisdom of discarding tables and taking a bold bracket, both as regards range and fuze, when working with clinometer elevation was clearly shown.

Ammunition Supply.

The question as to when setting fuzes should commence at the limbers often arose. It is, however, impossible to lay down any definite time, so much depending on circumstances. The first consideration is the quick service of the gun, consequently, after "keep to fuze" has been given, No. 5 must supply No. 3 with shell, having fuzes set as quickly as possible, and not wait till No. 3 has used up the shell in the magazines; should he do so, the fire will be delayed.

When supply was from the wagons, it was almost impossible to bring the leaders up to the regulation distance in rear of the guns. The recoil is often from 12 to 14 feet, and when this happens the team is bound to be thrown into confusion. The best position for the wagons appears rather doubtful, the regulations at home and in India being still different.

Several methods of attaching the breeching by drop links were tried; the one that appeared to answer best had the drop link on the breeching and not on the shaft.

In order to try and ascertain how far the limbers must be placed to the rear (supply being from the wagon), so that they may be fairly

safe, it was suggested that targets to represent them should be placed at various distances in rear of the gun targets. Unfortunately, only the following short trial could be made:—

Three 9 feet targets were placed 200 yards behind the 6-gun battery, on the slope of Yes Tor, range, 3200 yards. They were in position, while about 120 rounds were fired at the battery, and during that time received 1 through, 4 lodges, and 12 strikes. The results would probably be interesting if limbers could be represented behind each gun target and left in position for the season.

On the 29th June the ammunition supply was worked from the rear to the front, that is to say, the officer in rear had to keep himself informed of what was going on in front and offer the ammunition as required.

The supply from the line of wagons to the battery worked smoothly: the average time between the arrival at the guns of three full wagons and departure of the three empty ones was 4 min. 20 sec. The fact that the Division Ammunition Column has only two ammunition wagons per battery to send up, entailed a lot of shifting of ammunition and was a source of delay; the time from the arrival of the empty wagons back at the column to their being ready to start again was 45 min., but most of this was taken up counting returned stores, &c.; the actual time to fill a wagon being 9 min.

Competitive.

The general opinion was that the conditions were very fair, but that the qualifying marks were too low, and that a better standard would have been 300, 270, and 240. Reducing the ranges by 500 yards, and leaving out the intervals in Series II. and III., increased the vulnerability of the latter targets more, probably, than had been expected. No harm, however, was done by this, as the prizes are not now class prizes.

It was the almost universal opinion that marks for Fire Discipline should be retained, for although the standard of drill is now very high, they make every man on parade take an interest in the Competitive, and feel he is doing something for the common good. A few Commanding Officers thought 4-gun batteries had a slight advantage in this respect, as there are fewer chances of errors occurring with 4-gun than with 6. The plan of 4-gun batteries having an extra minute worked well, and is much more satisfactory than last year's, when 4-gun batteries certainly had the advantage.

The results show that there is not much to chose between 4 and 6-gun batteries, either in time, ammunition used, or effects.

The average number of rounds fired has not reached the full allowance; the time, therefore, appears about right, since it enables a quick battery to reap the advantage of its extra rapidity.

It is interesting to notice that, at Okehampton, Glenbeigh, and Shoeburyness, the order of vulnerability of the targets, reckoned by dummies disabled in the time allowed, appears the same, viz., II. Series, III. Series, I. Series. It is almost the same even if allowance is made for the extra shell fired in the 2nd and 3rd Series. The laying at the column being evidently slower than at the lines.

With reference to suggestions for next year, the opinion at Okehampton was that, with the exception of raising the standard, the conditions should not be altered. On the other hand, some advocate that an artillery target should replace the column.

The latter, although requiring careful laying and ranging, has the great disadvantage, that one lucky shell will do for it; and there is probably more luck with this target than any other.

The difficulty of an artillery target is the old one of handicapping 4 and 6-gun batteries. Perhaps the fairest conditions would be for the 4-gun battery to have an extra minute, the ammunition and target for both being the same; the target to be a 4-gun battery (detachments only), as it is probably easier for a 6-gun to concentrate on a 4, than the 4 to distribute on a 6.

Results.

I have given the average results of all service practice of the last five years, at the same time I do not think that they afford any fair basis for comparison from year to year, in consequence of there being so many variables. Take this year, notwithstanding that targets were arranged as far as possible similar to those of last year, the ranges have, nevertheless, been reduced by 300 yards, and there has been an extra column series, either of which is enough to upset the comparison; further, comparing average results from year to year exercises an unconscious influence in restricting attempts to render the practice more diverse or targets more difficult. The figures for those series, the conditions of which were similar in 1892–3, are also given.

The effects at the guns remain steady and appear small, but one must remember that the ranges are long, and that the 40 dummies are scattered over nearly 100 yards of front.

At guns at Glenbeigh the results are much the same, taking into consideration the invariable increased effect, due to the ground. Thus at Okehampton the percentage of target destroyed per minute at guns is 2·2, whilst that of all service practice is 5·07. At Glenbeigh the results are guns 4·16, all service practice 8·9. The latter in both cases being about double the former.

For the column competition series, I have also given Glenbeigh results, not to draw comparisons between the two stations, but because the reduction of 500 yards appears at both to have given nearly the same increase in effect.

Two interesting series were fired at dummies placed in echelon to represent an attack on a battery. The effects were very good, and, I think, rather surprised some of the officers of the other arms, at whose suggestion the targets and time had been arranged. On the first occasion 15 dummies were placed at six ranges to represent an advance from 1700 to 800. The fire was turned from one to the other without a pause, a Staff Officer giving the times. The total time in action was 23 minutes, during which time 66 rounds were fired and 74 dummies hit out of 90, notwithstanding that, owing to the paucity of shrapnel, 20 of the rounds were common shell.

In the 2nd Series, fired by the 38th, a 4-gun battery, the dummies

were placed in echelon at eight different ranges. The total time in action was 19 minutes, during which 69 rounds were fired and 62 dummies hit out of 86.

The time each target was under fire was estimated to be the same as infantry would have taken to advance from one to the other.

They were certainly not too long, as on the day of the field firing the infantry took from 50 minutes to an hour doing the same distance.

Drill.

The new drill was much liked. The relief of the No. 1 of laying worked very well. He was able to look after his detachment better, and when casualties occurred, could see that they were replaced without delaying the service of the gun. This was especially noticeable at the experiment on the 29th June, when it was found necessary to relieve the layers after 50 rounds. Also when the "deliberate" method was employed, it was a great advantage having the Nos. 1 left with the guns, and more than compensated for the disadvantage, that on these occasions the gun-layer knew the target before the Nos. 1.

With reference to this, it is interesting to note that the first nation to relieve their No. 1 of laying were the French, and they did it under the first Napoleon, when they probably had more experience of war than any one else. Both they and the Germans have gone a step further than we have, as their No. 1 only acts gun captain.

A minor difficulty of the new drill was that of No. 4, encumbered as he is with a sight, taking down the portable magazine. It is hoped that, as soon as the question of carrying the magazine is definitely settled, he will be relieved of this duty. Undoubtedly the best place for the portable magazine is on the gun carriage, if they can be carried there without entailing much extra weight, if not, they must be on a shelf at the back of the limber. The drawback to the limber is, that in the hurry of action it nearly invariably happens that at least one or two are carried away on the limbers, and if the supply is from the wagons, a gunner has to run some distance to fetch them.

Equipment.

There were few casualties to the equipment. The setting of the tangent scales is still a cause of many errors, and complaints were frequent that the clamp was unhandy and the marking coarse. The extreme difficulty of setting them accurately, between hundreds of yards, is, however, probably the reason of most errors. It would be a great advantage if the sight radius could be made sufficiently long to allow of every 25 yards being marked on the tangent scale for all ranges over 1500 yards. There is certainly the objection of the long tangent scale, but even if the fore sight were put at the muzzle, the present T scale would be long enough for ranges up to 3500 yards, and beyond that there are Scotts' sights and clinometers to fall back on.

From India, also, the same thing is heard. Thus, Colonel Murdoch, in his report on Muridki, remarks, "All batteries but one gave elevation in degrees and minutes, the reason given being that hundreds of yards are not subdivided. The tangent scales are only marked in hundreds of yards; they certainly should have 25 yards marked on them."

Colonel Murray, in the Saugor report, remarks, "Ranging in yards must be the simplest and most intelligent process to the ordinary stamp of gunner; and it was very noticeable that the Battery Commander who ranged in yards, instead of degrees and minutes, did not need the use of paper and pencil, or that constant looking over the battery range book, as much as those who were working in degrees and minutes."

The 13-pr. is often held up as a beautiful shooting gun, and one cannot help thinking that the sighting has a great deal to do with it.

Mekometer.

The mekometer was used by all the batteries and won universal praise, one Battery Commander even going so far as to say that he believed that he would have made better practice had he kept to his range-finder's range. The mekometer is much quicker and handier than the telemeter. The men were never in the way, and could go on taking ranges whilst the battery was firing.

One must, however, remember that Okehampton is an easy place for range-finders; targets are steady and generally easy to see, and there are no difficulties of trees, &c. to contend with.

Fuzes.

The batteries of the last division used the Mark III. time and percussion fuze; they gave good results. Owing to the dome and ring not shifting when clamping the fuze, some considered that fuze keys at the gun might be abolished, and the socket on the trail used for clamping.

The Ordnance Committee have kindly allowed me to give the following notes of the experiments carried out at Okehampton this season.

A light Horse Artillery equipment was tried by "P" Battery. The chief weights were:—

	cwt.	qrs.	lbs.
Gun carriage and stores	9	1	16
Gun	6	0	7
Limber body	4	2	7
" wheels	3	2	12
44 rounds	5	1	19
Stores	0	3	12
Total	29	3	17
Wagon body	4	2	12
" wheels	3	2	12
48 rounds	5	2	17
Stores	0	3	12
Limber	14	1	22
Total	29	0	19

Since the above weights were given some extra stores have been added, and Major Flint has kindly sent me the following results obtained by weighing on a weighbridge:

	cwt	qrs.	lbs.
Gun complete without kits	30	3	0
" " with two mens' kits	31	2	0
Wagon " without kits	30	1	0
" " with two mens' kits	31	0	0

The charge is 12 oz. of cordite, giving a muzzle velocity of 1550 f.s.

The gun has an axial vent, and is sighted with a short radius; the sight being marked in hundreds of yards and degrees very similar to the 12-pr.

Two of the guns had a twist of 1 in 28, and two of 1 in 35. The object of trying the two twists was in order to obtain the slowest commensurate with sufficient accuracy. A gun of 1 in 40 had been previously tried, but was not sufficiently accurate: it, however, showed that the above reduction increased the effect of time shrapnel by about 33 per cent. Experiments abroad have, I believe, shown that reducing the twist from 1 in 25 to 1 in 32 increased the effect of time shrapnel by about 25 per cent. at 2000 yards.

At the practice 12-pr. service shrapnel were used, and the combination of low velocity and head burster in a non-opening shell made the proportion of ineffective bullets very large.

Extensive experiments are, however, being carried out to obtain a better shrapnel; either one with a base burster, or one with a head burster that breaks up the shell.

The carriage is rigid and very simple. On each side is a pocket to hold two rounds. It is fitted with drag-shoe brakes, and the recoil is very small.

The limber has one non-removable box, having a partition in the centre, and fitted with two lids.

The limber carries 44 rounds and the wagon 72, so a total of 136 is obtained. It is fitted for pole draught.

On the back of the limber are shelves on which the portable magazines are carried. No spare wheel is carried on the wagon.

Cordite was used by the batteries of the last division, and gave very good results; there were, however, many hang and miss-fires. When the men had got into the knack of pulling the lanyard, the miss-fires nearly ceased in the axial vented guns; a good many, however, still occurred in those with radial vents, and both Battery Commanders preferred using black powder in their competitive. The vents and tubes are experimental, and will, I believe, not be adopted.

A few shrapnel shell, having a head and base burster, were tried to see if the burst was sufficient for ranging. The appearance of the burst was certainly far larger than that of the service shrapnel. A more extended trial in various climates would, however, be required before a definite conclusion could be arrived at.

Another scheme suggested by Major Wynyard was tried. It consisted in replacing the time arrangement in the time and percussion fuze with powder; the bursts of these appeared rather smothered and were not very clearly visible.

Scott's sights marked in yards were much appreciated. They were used by the leading battery at all three ranges in the competition, notwithstanding that the Battery Commander and the gun-layers had rather a dislike to the regular Scott sight; as previously mentioned they were also used with success when giving elevation by clinometer.

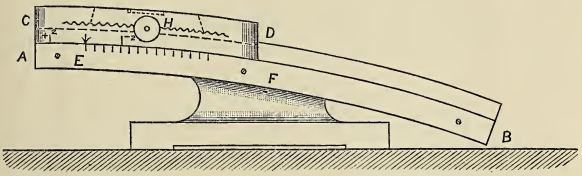
It should not be hard to fit an adjustable bubble to the sight. This would enable the Battery Commander to order tangent elevation, even when working by clinometer, the angle of sight being compensated for by adjusting the bubble; it also does away with the necessity of giving different elevations to different sections should the battery be on ground sloping to a flank.

Clinometers made on the German and Austrian patterns were tried; both are made on the curve principle, and have adjustable bubbles. They were marked in degrees and yards, and appeared very simple, strong, and less liable to injury than the Watkin clinometer. They also had the advantage in lightness, the German only weighing 2 lbs. as against $4\frac{1}{2}$ lbs. the weight of an improved Watkin clinometer, also fitted with an adjustable bubble.

Fig. 1 is a rough drawing of the German one. It is made in two pieces. The bottom of the lower part *A B* fits on the clinometer plane and the top is formed on a curve, marked in hundreds of yards at the side *E F* and on top in degrees 0. The top part *C D* fits on the curve by means of undercut grooves and slides up and down the curve.

Fig. 1.

Elevation.



Plane of Gun.

Plan.

The bubble is contained in the slide *C D* and can also be made to move independently of the slide by means of a screw *H*. A small-scale *K L* registering this latter motion.

To use it, the gun is first laid with the tangent scale at the elevation ordered, the slide is also set at the elevation ordered and the clinometer placed on the gun. The bubble is then put in the centre of its run by working the top screw, thus automatically registering the angle of sight

Six sights with erecting eye pieces were also tried and likewise considered a success, the small and darkened field being apparently more than compensated for by the advantage of seeing the target right side up. The trial, however, was very short, and, I believe, a more extended trial is to be made. These sights had the further advantage that the object glass, when racked in, was at the so-called infinite focus, thus simplifying the focussing; it would be better still if it were fixed. The present sights could easily be fixed at the infinite focus by a single small screw put in under the ray shade.

An improved wagon for the 12-pr. was also tried: the weight behind team is approximately the same as with the gun, and it is designed to carry 100 15-lb. shell.

AVERAGE RESULTS OF COMPETITIVE PRACTICE.—1893.

Station practised at	Time.	Rounds.			Hits.			Credits.			Fire Discipline Credits.	Total Credits.
		I.	II.	III.	I.	II.	III.	I.	II.	III.		
Okehampton—	′ ″											
4-gun average ...	7 54	21·16	23·87	23·88	75·89	105·25	96·12	53·62	58·38	62·88	90·25	265·12
6 " " ...	7 6	19·43	22·86	24·14	144·86	96·71	84·14	64·57	63·43	56	91	274·14
General " ...	...	20·4	23·4	24	108·07	101·27	90·53	58·73	60·73	59·67	90·6	269·4
Glenbeigh—												
4-gun average ...	7 33	22·2	24	23·8	154·6	255·6	115·8	73·2	84	76	93·8	327
6 " " ...	6 40	19	24	24	46	152·6	85·6	36·6	84·6	72	95·6	289
General " ...	...	21	24	23·87	113 87	217	104·5	59·5	84·25	75·12	94·5	312·75
Shoeburyness—*												
4-gun average ..	...	16·5	23	23·5	43 5	76·5	49	55	66	59	86	266
6 " " ...	...	19·5	22·83	23·75	67·7	97·58	81·75	50·5	71·42	67·25	90·25	279·42
General " ...	...	19·07	22·86	23·71	64·21	92	77·07	51·14	70·64	66·07	89·64	277·5
Morecambe—*												
6-gun average ...	6 56	21·5	23·5	24	105·1	55·6	72	70·5	53·1	64·5	87·8	276

* Practice ammunition.

Results of Practice at Targets Representing Advancing Infantry.

Battery.	Times.		Approximate Range.	Rounds.	Effects.		Targets.
					Hits.	Dummies.	
	Min.	Sec.					
14th Field ...	3	30	2000	8	18	11	15 standing dummies.
	3	32	1800	9	52	12	" "
	4	30	1500	12	113	15	" "
	3	35	1250	11	58	10	" "
	2	35	1200	6	34	13	" "
	5	30	800	21*	13	13	" "
Total	23	12		67	288	74	90 " "
38th Field ...	2	30	1800	8	8	7	12 standing dummies.
	2	10	1700	7	20	11	" "
	2	30	1550	8	26	11	" "
	2	0	1450	8	32	9	10 " "
	3	3	1200	11	31	7	" "
	2	15	1100	10	13	6	5 " " 5 kneeling "
	2	15	950	8	14	5	" "
	2	15	800	9	11	6	10 " "
Total	18	58		69	155	62	86

*20 common shell, dummies blown to bits.

General Idea:—Battery in action and firing, suddenly ordered to turn on to infantry advancing on the battery.

Targets placed in echelon to represent this advance; the fire being continued from target to target without a pause.

R	Target.	Remarks.
Okeh	uns, 3 wagons, and 36 standing ummies.	On Bluff. " Yes Tor.
	uns, 3 wagons, and 40 standing dummies.	" Bluff. " Yes Tor.
	tanding. 15 standing. 100 kneeling.	In one series in 1893 the supports were kneeling.
	ummies in 4 groups, 25 yards between groups, 1 pace between dummies.	
	tanding dummies.	
	" "	
	" "	
	" "	
	" "	
Glenb	" "	
"	" "	
Okeha	ummies.	
	"	
	7 "	Including Competitive.
	"	" " and under cover.
	"	Including Competitive.

Battery Station.	Year.	No. of Series.	Average time in action.	Range.	No. of Rounds.	Effect. Hits.	Effect. Men.	Hits per Shell.	Men hit per Shell.	Percentage of targets destroyed per minute in action.	Target.	Remarks.
			′ ″			ARTILLERY IN THE OPEN.						
Okehampton	1892	13	12	2960	25	36·4	9·8	1·456	·392	2·268	6 guns, 3 wagons, and 36 standing dummies.	On Bluff.
"	"	15	13 30	3320	25	14·46	8·3	·578	·332	1·707		" Yes Tor.
"	1893	12	11 18	2845	24	19·8	9	·825	·373	2	6 guns, 3 wagons, and 40 standing dummies.	" Bluff.
"	"	12	10 30	3285	24	21·6	10·16	·9	·423	2·41		" Yes Tor.
"	Average of	52	11 49·5	2845 to 3320	24·5	22·9	9	·93	·37	2		
						KNEELING DUMMIES IN LINE.						
"	1892	39	6 42	1300 to 700	20·7	53·5	28·9	2·58	1·39	3·32	15 standing. 15 standing.	In one series in 1893 the supports were kneeling.
"	1893	36	7 10		21	108·3	41·58	5·16	1·98	4·46	100 kneeling.	
						STANDING DUMMIES IN LINE.						
"	1892	15	8 20	2000	24·75	100·5	34	4·06	1·37	5·12	80 dummies in 4 groups, 25 yards between groups, 1 paco between dummies.	
"	1893	12	8 30	2000	23·7	54·1	25·6	2·28	1·08	3·76		
						COLUMN OF FOURS.						
"	1892	15	6 24	2470	13	96·1	26	7·39	2	8·12	50 standing dummies.	
"	1893	12	6 30	2410	13·9	79	23·25	5·68	1·67	7·15	" "	
"	"	12	6	1780	12·9	216	36·6	16·75	2·83	12·2	" "	
"	1892	11 6-gun.	...	3000	25·5	53·1	26	2·08	1·02	...	45 " "	
"	1893	15	6-gun, 6′ 38″ / 4-gun, 7′ 30″	2500	20·4	108·07	29	5·29	1·42	...	" "	
Glenbeigh	1892	3 6-gun.	...	3000	25·3	...	27·5	...	1·08	...	" "	
"	1893	8	...	2500	21	113·87	29·75	5·42	1·41	...	" "	
						AVERAGE RESULTS OF BATTERY SERVICE.						
Okehampton	1889	...	17 0	2231	20·5	63·4	17	3·1	·331	2·17	46 dummies.	
"	1890	...	12 11	2325	20·91	43·7	17·7	2·08	·306	2·98	49 "	
"	1891	...	11 57	2331	25·79	48	18	1·5	·697	3·43	43·67 "	Ineluding Competitive.
"	1892	...	8 3	2285	20·97	48·2	19	2·3	·91	3·65	61·2 "	" " and under cover.
"	1893	...	7 58	1938	21·17	89·24	29·22	4·24	1·38	5·07	72·5 "	Ineluding Competitive.

DISCUSSION.

COLONEL C. E. S. SCOTT.—As somebody always has to open a discussion, I will just make a few remarks. I am sure we have all been very much interested in the admirable lecture to which we have been listening, and there are just one or two points in connection with it to which I should like to refer, although they are very minor ones.

One point is with regard to the carriage of the portable magazine. This is a question about which there is a great diversity of opinion, and a great many methods have been suggested for carrying it. As Major Hughes has pointed out to us, on the gun carriage of the experimental R.H.A. equipment, which is now under trial with "P" Battery, there are pockets on each side to hold two rounds, and the portable magazines are carried on the shelves at the back of the limber. This appears to be a very convenient arrangement, and, I understand, it relegates the portable magazine to the original purpose for which it was designed, namely, simply to be a bag for the conveyance of ammunition from the limbers or wagons to the gun; and if some sort of arrangement like this can be adapted to the existing service equipment it would probably meet the views of the Regiment and solve the difficulty.

Another point is, with regard to the graduations of the tangent scales. I think myself that there will probably be considerable difficulty in connection with marking the tangent scales at every 25 yards, as suggested by Major Hughes, and I believe it would not meet with universal acceptance. Perhaps some of you will remember that a year or two ago it was brought to notice by the Commandant at Okehampton, that owing to the numbers of hundreds of yards not being marked opposite each graduation on the tangent scale, errors in setting were constantly caused; a new design was then called for, and a tangent scale was brought out in which the numbers of hundreds of yards were marked opposite the lines to which they refer: it was sent down to Okehampton, and approved of by Battery Commanders. It was then considered advisable to have tangent scales graduated in this way in future, and a number of them so graduated was sent out to India. It was only a short time ago, however, that a telegram came from India asking that the supply might be stopped as the design was not approved, because it was found that the multiplication of markings on the tangent scale caused confusion. If this is the cause when the hundreds of yards are marked, it seems to me that it will be still more so when every 25 or 50 yards are marked.

Then with regard to the clinometers. I think in making a comparison between the German clinometer and the Watkin clinometer, it ought to be remembered that the Watkin clinometer which was sent down for trial at Okehampton this year was one of the original clinometers altered, and fitted with a second drum and an adjustable plane. It was sent down with the object of testing the system of laying the gun from under cover in conjunction with a hydro-clinometer. The trial was not carried out, so it will have to be made next year, but the whole object of the trial was to test whether the principle of thus laying the gun from under cover is sound; if it is found to be so, I understand from Colonel Watkin that he would have no difficulty in making a clinometer which would meet all the objections that have been raised by Major Hughes. I think we also have to remember as regards the Mark II. pattern Watkin clinometer which is now in use in the service that Colonel Watkin was called upon to fulfil certain conditions, and he did so. If you wish to have a smaller clinometer, and one that will also not weigh so much, I understand that Colonel Watkin can easily supply it if you will accept a clinometer with less range. I have now in my pocket, for instance, a small clinometer of his *(producing the same)* which will range up to $13\frac{1}{2}$ degrees, and is graduated up to five minutes, so that one can easily set it to two minutes; it is an instrument that one can carry in one's waistcoat pocket. I think we

should remember this, because if the Regiment will only say what they want in connection with the clinometer, I am sure Colonel Watkin will be able to produce an instrument which I believe myself will be superior to the one we have before us here.

Colonel J. F. Maurice, c.b.—There are a large number of points in Major Hughes' paper on which I should like to touch which I must skip for want of time, because there is one passage in particular in which he mentions my name, on which I want to say rather more than about others.

The first paragraph about which I should like to say a word is the one in which Major Hughes says, "If one cannot carry fuzed shell in the limber-boxes, some quicker method of fuzing them is necessary." What I want to know, not, of course, from Major Hughes, is "Why cannot we carry fuzed shell in the limber-boxes?" One battery did carry them for an entire season with perfect success; I should like to see every battery in the service with fuzed shell (without bursters in them) carried for an entire year. If at the end of that year we got through without any casualties, as I think we should, we might carry them for the following year with bursters, and after that always; and I am sure we should gain enormously.

I think everybody who has had any experience at Okehampton, at all events this year, will agree in that little matter about the change of "cease firing—common, load;" and I only mention it as perhaps no one else may speak who has been at Okehampton this year.

As to the next point, "Reconnoitring Positions," Major Hughes says that there is rather a dislike on the part of Brigade Division and Battery Commanders to leave their commands and advance well ahead to reconnoitre the next position. I am sure that anybody who has had the experience that some of us have had during the manœuvres of this year will agree that for practical purposes that is one of the most important points that we have to attend to. I think, however, that the cause of any of us not appreciating it is simply the difficulty of getting throughout the country enough manœuvring ground. I know on one occasion I was myself more than two miles, nearer three miles ahead of my batteries; I was trying if possible to get the guns to a particular position, if our infantry were able to make it safe. Unfortunately the enemy's infantry anticipated ours. It was only because of the early information I obtained of this fact because I was about three miles ahead of my batteries, that by galloping as hard as I could back to the batteries I could just get them into the next best position. Anybody who has practically tried it will agree that whoever is in independent command, whether Brigade Division Commander or Battery Commander, has simply to be as far ahead as he can possibly get to be able to reconnoitre what the enemy is doing. The difficulty that Major Hughes speaks of is a most natural one, and is produced almost entirely by drill as opposed to manœuvres. As far as Brigade Division Commanders are concerned, I think a short experience of field manœuvres soon cures them, and as they have under them Majors whom they know they can trust there is not the same temptation to cling to their commands. But the association of a Major with his battery is so personal and intimate a one that it is very natural that he should not like anyone else to nurse his own child for him. It takes, therefore, a good deal of experience of the practical necessity for being well ahead of their batteries to persuade them to leave to subalterns the guiding of a battery across a marsh or along a rocky hillside. It seems to me the more Majors can be encouraged to do this the better. There is no doubt of the advantage of the time gained by their being well ahead. Our subalterns if they only get the chance are quite fit to be trusted with the responsibility; I think that the more the subalterns are trusted with it the better they will do it. (Applause.) But that certainly does want pressing on every possible occasion.

I may next say just a word about that question of indirect laying, because I think from what I was told at Okehampton that I used it this year more than it was used by any other Brigade Division. I think that the delay of which Major Hughes speaks is simply due to want of practice. It is obviously much harder at most stations to properly practice indirect laying than almost any other part of the preliminary work. In the case of a particular battery to which Major Hughes alludes, the circumstances of which I know very well, it was solely just those little points about the difference between the clinometer angle and the range-finders range for fuze purposes, which require to be mechanically taken from long practice, that were not attended to during that very absorbing time of range and fuze finding when the Battery Commander has his full attention taken up in looking at his target and giving his successive orders for range and fuze. I believe myself that with a little more practice there would be very much less delay up to the first round than was the case this year. Indirect fire answered well and worked quickly, as Major Hughes says, as soon as it was fairly started. It would, under certain circumstances, be of such importance on service that I cannot help thinking it is worth taking some trouble to get it right.

I now come to a subject on which I want to speak at more length, because, I am sorry to say, I dissent from almost every sentence in what Major Hughes has said about it, and therefore I know he will be glad that I should say what I have to say. He says: "One heard a good deal about 'distribution' and 'concentration' at Okehampton this year. The subject has been so well thrashed out by Colonel Maurice and Major White, and finally summed up by Captain Granet, that there should be no more danger of considering dispersion and distribution to be one and the same; nor should there be any further chance of anyone thinking that the advocates for 'distribution' desire to discard 'concentration' against a tactical point, the value of which is recognised by all." The first thing to which I take objection is to the statement that "The subject has been well thrashed out." In order for a question to be thrashed out the points made on either side must be dealt with on the other. I certainly have not dealt with the points made by Major White because, apart from private conversation, I have not written or said one word about what Major White has put forth in his paper; and I think I may safely say that Major White has not touched the points that I made, as I think I can show. My points remain untouched, and it is a matter of such enormous importance to us, if I am right in my view of the question, that I am anxious that it should not be hastily dropped as having been satisfactorily disposed of. I believe that this room, with this audience, is the right place to deal with it and thrash it out. (Applause.) Major Hughes' next words bring me to the points that I want to make. He says, "There should be no more danger of considering dispersion and distribution to be one and the same; nor should there be any further chance of anyone thinking that the advocates for 'distribution' desire to discard 'concentration' against a tactical point, the value of which is recognised by all." Now, I thought it just as well to bring with me Major White's reply to me, and I think I can show, without detaining you too long, that one of the senses in which he uses the often very useful term "distribution" is precisely the thing which I call "dispersion," and of which I allege that it has led to disaster in every battle in which it has been tried, and that never except by the exact opposite of what he proposes has success by artillery been obtained. Many of you will no doubt never have seen the paper of mine to which Major White's was an answer, and, therefore, I may perhaps venture to touch on some of the points which have not been dealt with before I come to the mode in which Major White refers to what I want to tackle. I can best put the case in a series of propositions.

1. That, valuable as the experiences at Okehampton are, they may be made most dangerous if they are in no way referred to the experiences of war; that

in order to determine what your action ought to be you must go to the history of battles to find out what is going to happen in battle.

2. All of us at Okehampton want to make as many hits as possible on the targets. In order to obtain as many hits as we can in competition we must spread or "distribute" our fire along the targets—on that there is no difference of opinion whatever.

3. What we have to consider in war is not the effect only or even chiefly of the shells that hit. It is all important to us whether the shells that do not hit shall increase the moral effect of those that do, or, on the contrary, greatly diminish their moral effect.

4. Look at Major Hughes' figures as given here. They lead exactly to the same conclusion that I had come to before, namely, that under the favourable circumstances of peace practice one shell represents about one man hit by a bullet. That is a very small proportion for the number of bullets flying through the air. I say that what we want to do is to make those 176 bullets [1] per shell that are flying through the air and hitting nobody for everyone that does hit tell on our side instead of against us.

5. The inevitable result of a fire, spread as we at Okehampton spread it over our targets, is that you, if you are exposed to it, have plenty of time to observe how comparatively few shells do produce destructive effect; therefore, when a shell falls and kills a number of men or horses, as I have seen it do, when under such a spread fire, you have plenty of time to calculate that that incident is of rare occurrence, and it will be a long time before it happens again.

6. On the other hand, if shell after shell is pouring over the place; if continually, because of the concentrated fire upon it, destruction is being produced, then every shell that is in the air, even though it is in fact harmless, has the moral effect on the men of being a shell that is possibly going to produce that disaster which they see before them caused by the shells that have struck and are striking.

7. I have spoken again and again to men who have been under artillery fire, and I have never met anybody who had been in that position who did not agree with me that that was the important point of the whole matter. Because never in war is your decisive effect, is the victory winning effect, to be fairly estimated by counting the number of men you kill somewhere or other.

8. In far the greater number of cases where there has been any fair stand up fight at all and not a mere massacre, it is the victorious army that has up to the moment of victory lost more men than the one that is ultimately beaten. When the victory is gained then, of course, the tables are turned, and the result is the other way. But you cannot calculate, as you would at Okehampton, simply hit by hit what the effect of what you are doing is.

9. So far from agreeing with Major Hughes that the practical result of our discussion is, as he says, that we are brought to the artillery duel as the one point upon which any difference exists, I say that the point which is here raised of the distribution in the sense of that spreading of artillery fire, which is suitable against targets, being necessary against artillery in battle, involves the whole question whether for any purpose whatever we can employ our artillery in producing the decisive effect at the decisive point at the decisive time; and that I take it is the *metier* of artillery under all circumstances and always.

10. The dictum of Napoleon that he who suddenly and unknown to the enemy brings an overwhelming fire of artillery to bear upon the decisive point at the decisive time wins the day, covers all that long period of war which ended

[1] Assuming that one man on an average is hit per shell, it follows that as there are 177 bullets in each shrapnel shell the proportion of bullets that do not hit to those that do is as 176 : 1. Therefore, I say that in attempting to regulate our fire only with regard to the one that hits we ignore the importance of $\frac{176}{177}$th of our whole fire, *i.e.*, enormously the greater part of it.

at Waterloo. Without taking up your time by quoting any particular battles, as I should be quite ready to do and have done elsewhere, I may say that the same story has to be told again and again since his time. I think we must all see that the conditions of modern war make it a matter of more paramount importance with regard to the general victory-winning power of artillery than it was in Napoleon's time; because, whereas in the days of Napoleon the one purpose that he had was to mass, to concentrate, to pour in overwhelming masses of infantry on to a point that he wanted to seize, practically that is in our time impossible. You may mass your infantry, and as long as they are exposed to fire by an enemy in adequate strength and untouched by artillery the massing them simply means increasing the target and not increasing the fire. So far as I know the only means by which, except in night fighting, concentrated force can in our time be made to tell at the decisive point is by bringing to bear an overwhelming power of artillery; and, therefore, it is on us that depends the decisive question of the future in winning a battle. Therefore this is a most serious question for every gunner to consider.

Those are my propositions. Turning now to the reply to them, I cannot admit that the question has been dealt with in Major White's paper in a way to bring victory in future. For, in the first place, I may say that in all the earlier part of his paper Major White appears to suppose that we have proposed to concentrate our fire from the moment that we come into action on a particular point. I do not think that any of us who regard concentration as the one decisive mode of artillery action would for a moment think anything of the kind. I cannot conceive how it should be supposed that the men we have now at Aldershot are likely to be unaware of the fact that it is much more easy for a simple battery to range than for a number of batteries; and, as it is always desirable to have your ranges found for you over as large an area as possible, certainly during the period of ranging, we should employ our batteries in ranging on as many different points as possible. It never occurred to me that that had anything to do with the question of concentration of artillery fire. What I maintain to be destructive of the whole possibility of the use of artillery is this phrase that Major White uses with regard to it. He has spoken of the concentration after the range has been found, or as many ranges as possible, and he says, "It is my firm belief that to attempt the operation at this stage will be to throw away the action altogether." Now this is based on the assumption that unless the whole of the enemy's artillery is kept under fire gun for gun you will suffer so terribly from the fact that a certain portion of his guns are not fired at that your condition will be hopeless. Therefore by distributing or, as I should say, dispersing your fire all along the line you must first overcome his fire before you can concentrate at all.

I say that no authority, German, French, or other, will persuade me that that is anything else but an absolute violation of the whole experience of war; that it means simply that you are depriving yourself of the opportunity of producing the decisive result at the decisive time, which can only be gained in that, as in all other warlike operations, by gaining over for the decisive point the balance of advantage, by reducing the strength which you employ at those points where nothing very decisive can occur.

The very art in such a matter consists in so choosing your ground and *distributing* your troops on it that nothing very decisive can happen in those parts of the fight where you leave the enemy to do his worst.

I have said elsewhere that I believe that in almost all conditions it is possible for you to concentrate a very large mass of your artillery fire without exposing yourself to that use of gun for gun by the enemy, which Major White assumes to be inevitable; that you can in almost all cases place your guns in what I call a position of avoidance as regards that portion of the enemy with whom you do not wish to deal. That was what was actually done at the battle of Gravelotte

in that enormous concentration of artillery that won the battle there. Most of the artillery of the 10th, 12th, and the Guards, about 240 guns in all,[1] concentrated against Canrobert's Corps which had little more than half its proper complement of artillery, not more than 56 guns in all. It not only produced an overwhelming effect, but from the position of the woods and the fall of the ground this artillery was not exposed to the fire of the French artillery along the remainder in the position. Throughout the whole of the remainder of the position the German artillery was numerically inferior to the French, and without that numerical inferiority the superiority at the decisive point of St. Privat could not have been gained. Very likely in consequence of the remainder of the French guns being comparatively less fired upon than the others the Germans sustained a greater amount of loss than they would otherwise have done,[2] but you must sustain some loss, you cannot make omelettes without breaking eggs, and if you are going to get artillery into such a position as to gain the point that is ultimately to decide the fate of the battle you can only do it by taking your chance of losses at other points where the issue will not be decisive.

Then I come to the question of the different authorities that are cited by Major White. I cannot go through them all, but that anyone like my friend Major Hughes should possibly have been able to read over this article of Major White's and suppose that these citations of authority represented the purpose for which they are quoted is to me an amazement. Let me give you one, "Hoffbauer makes a similar allusion when discussing the battle of Gravelotte," that is supposed to be defending the principle of "distribution" in what I should call the sense of "dispersion"—that is the use of gun for gun—in this paragraph, "The artillery of the 1st Army now formed a mass of 26 batteries, 156 guns in all. The Commanding Officers were careful to concentrate the fire on the most important points wherever this was necessary or had not already been done." Now how that is put forward as a proof that the Germans did not concentrate is to me one of the mysteries of language. I hope I have made it clear to you. This is quoted as an illustration that the Germans did not concentrate—that they were on the side of what is called "distribution."[3] There is a certain other use of the term "distribution" in Major White's article to which I have no objection whatever, provided it is not used to cover this gun for gun theory. When we speak of concentrating on a position he says it must not be against a mathematical point. It never occurred to me that misunderstanding was possible. I am supposing such a concentration of guns as took place against St. Privat. Certainly St. Privat was quite a small enough object for that number of guns,

[1] The Prussian Official names only 192 guns as actually employed against St. Privat prior to the final attack, but more than 240 must have been in one way or the other engaged in this part of the field, because, in addition to the artillery of the three Corps, part of the 9th Corps artillery was also used.

[2] As a matter-of-fact, the Germans had much the worst of it everywhere else but on the extreme right of the French position till that was carried.

[3] I must do Major White the justice to say that I did not realise the purpose for which he made this quotation. Anyone, however, who will refer to the passage, Hoffbauer p. 240, will see that the statement about the Germans having previously established their superiority is in no way whatever put as the reason for the concentration, but is a mere subsequent record of the situation at the time. The previous citation from Hoffbauer in Major White's paper in the *United Service Magazine* has nothing to do with the subject. Hoffbauer's object in it is to assert the value under certain circumstances of very long ranges. I quoted in my lecture from the Prussian Official and from Hoffbauer case after case where the Prussians had gained success by concentrated fire long before any superiority had been obtained. Hoffbauer everywhere records the success of concentration. "In this battle, 'Gravelotte,' the principle of employing artillery in *masses* was carried out *from the very commencement*," p. 323. Much more important as regards the point of issue are the numerous instances he gives, such as this, "the artillery mass of the left wing, which fired on the French columns advancing in support *and drew upon itself the fire of the enemy's artillery*," p. 138, not, therefore, as a preliminary subdued, and not making the use of the artillery impossible on that account, though in greatly superior strength to the German artillery.

and it was most desirable with such a fire that no part of the village should be left as a refuge. The same remark applies to what he has said about the stories of a house or distribution in depth in a wood where the lisière has already been made untenable.

I think I may, perhaps, have left a false impression, which I am anxious to correct, by the use I made of the phrase about 100 guns. I was enforcing this particular point, that though the best way in which we can silence guns is not that of directing our fire to the destruction of *matériel*, but to that of disabling gunners, yet that our success against artillery can only be measured by the number of guns silenced and not by the number of gunners hit. If by hitting 40 men I silence a battery I produce an incomparably greater effect than you do if you kill 50 or more men at the rate of one man per gun. You then do not silence one gun. It must depend on a variety of circumstances how many batteries you employ in silencing one battery in the first instance. All I say is you cannot do it too quickly and suddenly if you want to produce moral effect. There is one of the experiences of Okehampton that I should have liked Major Hughes to have enforced rather more emphatically than he has done, although it comes out most admirably in these tables. I maintain that these tables alone, if nothing else (and I think the whole experience of war bears it out [1]) show decisively that the worst target that artillery can ever be employed against is artillery. Just look at the numbers as they run down here. The "percentage of artillery targets destroyed" begins at 2·41, the last average so far as artillery is concerned is 2; but the moment you get the most difficult of all forms of infantry, the kneeling dummies in line, you run up at once to 3·32 and 4·46, and directly you get to standing dummies in line you run up to 5·12 and 3·76. When you begin to get to columns of fours you get to 8 and 7 and 12 per cent. Compare that with the little more than 2 of the artillery, and yet the artillery target fairly and truly represents the actual artillery target that you have to fire at as nearly as possible; for dummies between guns are not less exposed than men in war. On the other hand, as for these infantry targets, I should like anybody to go and look at the sort of targets you get at the infantry and cavalry manœuvres at Aldershot and judge for a moment whether the 50 dummies forming a target 3000 yards off at Okehampton represents in any way the kind of infantry targets that artillery would get in actual warfare. I say that those figures of the tables, though absolutely decisive in themselves, do not represent a fourth of the fact. I am sure that anybody who has looked at the masses of red men as they appear on any field-day and thinks what sort of target they represent will agree with me that those Okehampton infantry dummies are so very much more difficult a target than the real one that these comparative losses in no sense represent the difference in the effect we can produce respectively on artillery and infantry. Therefore, I say that when we can get it the best target for us is infantry, and as long as I have a good infantry target I should always like the enemy's artillery to fire at me, because I should know then that they were not preparing the way for their own infantry, which is the one decisive work for artillery. Therefore, it is on those grounds that I am most anxious to insist that this assumption of the necessity of firing at everyone of the enemy's guns lest they should have a chance of firing untouched at you, means that you will not be able to use your arm for the thing that we all care about, namely, the winning of the victories of the country.

As regards one further point it is very important that it should be settled one way or the other. Major Hughes speaks here of all of us who were at Okehampton being all agreed as to the dispersion of batteries with regard to battery

[1] *e.g.*, as a result of the Duke of Wellington's long experience our artillery at Waterloo was forbidden to fire at the enemy's artillery *at all*.

against battery. For ranging purposes undoubtedly we were all agreed, but when it came to the point afterwards as to whether we should concentrate I can only say that the artillery drill-book recently issued decides strongly for concentration, not for gun for gun use of fire; that it has been sent round to every artillery officer in authority in England, India, and all over the world, and that it has been accepted without any demur. That must outweigh the casual impressions of conversations formed even by so excellent a reporter as Major Hughes. I can answer for it that those whom I have spoken to both among Brigade Division Commanders and to Battery Commanders who were at Okehampton this year believed firmly in the value of concentration after ranging, and one would have liked to ask any who expressed a contrary opinion whether they were speaking of targets at Okehampton or war.

Major W. L. White.—I quite agree with Colonel Maurice, that this is the right place in which to thrash out this question of concentration and distribution of fire; it was for that purpose that I came here to-night, in the hope that we should have an opportunity of doing so. To begin with, we do not seem to be at one upon the meaning of the word "distribution." As I believe I am guilty of introducing it into the drill-book (first of all into a paper in the Institution "Proceedings") I may say that I do not use it in any different sense from what I have always understood it in the service. In describing a campaign (and nobody is more competent to do so than Colonel Maurice), I am sure if he were giving a short description of it he would say, "The following was the *distribution* of the troops on a certain date," or in describing an incident of a battle-field he would use the word in the same sense Now that might not mean dispersion; it might mean, on the contrary, intense concentration. Therefore to say that "*distribution*" means "*dispersion*" is taking the word in a sense that is not military. We have used the word in a military sense for a long time, and I do not see why it should not continue to be so used.

Colonel J. F. Maurice, c.b.—Do you adhere to the phrase that the artillery must be kept gun for gun firing at the enemy after the range has been taken? If you mean that by "distribution," that is what I call "dispersion." The use of the word to which you are now referring I have already admitted to be a most valuable one.[1]

Major W. L. White —Then one great difficulty has been done away with. What I still adhere to is this (they are not my own views; they are given at secondhand from all the authorities I have been able to hunt up from foreign sources) that you must maintain fire over the whole front of the enemy bearing upon you until you attain superiority, and then you can afford to concentrate against individual points. I have lately been at the trouble to hunt up every drill-book I could lay hands upon, and a great number of works upon artillery fire, and that was the gist of the views expressed in them. If you have superiority of numbers you can have technical concentration at certain points from the commencement. In reading about the technicalities of war I would ask you to be careful. When you read of the concentration of huge masses of guns as that of the Germans at the battle of Gravelotte, the concentration of fire in that case was not a technical concentration, it was not like playing a garden engine up and down a line of opposing batteries, leaving some alone. We know this, because we have

[1] This remark referred to the following note printed with the paper to which Major White originally replied:—"The term 'distribution' is susceptible to two different meanings. In our 1893 Drill-Book it is used to imply the regulated employment of the artillery of an army for such tactical purposes as circumstances demand. Obviously in that sense it is a very useful word. The word has, however, been also used to cover a notion that we ought from the beginning of an action to take care that none of the enemy can fire upon us without our firing upon them. It is this notion which it is my object to combat in setting 'concentration of fire' in contrast with 'distribution,' or what is in this sense the same thing 'dispersion of fire.'"—*United Service Magazine*, April, 1893, p. 691.—*J.F.M.*

the authority of one of the best technical writers, who says, as quoted by me in that paper from which Colonel Maurice has read. "A tactical regulation of fire was then existent, a technical one such as is in the present day necessary . . . was not acknowledged" (Von Rohne "Regulation of Fire in Masses of Artillery.") We all know the great concentration of guns at the battle of Wörth. People talk of this concentration and come to the conclusion that the Germans concentrated the fire of all these guns on one point and swept up and down till they had silenced their opponent's batteries. That was not the case. Although the German accounts do not mention what the distribution of the fire was, others do. The French accounts do. The French had nothing to be ashamed of; they had no reason to minimise their defeat; they made a good fight against enormous odds and they are proud of it. One of the best accounts was that of de Chalus (himself an artillery officer and likely to notice these things), he says that at 10 o'clock the German artillery, although the artillery duel was at its height, was firing at everything on the ground. It was fire from a concentrated mass of guns, and the fire was concentrated on the tactical point, the Elsasshausen Plateau, I admit, but it was concentrated on a particular point, it was not even confined to the artillery; therefore it was not the technical concentration that Colonel Maurice apparently thinks it was:—"The enemy fired not only at our batteries, but also at the infantry and the cavalry wherever any targets were presented by them."[1] At 10.30 the Prussians continued to fire at all points where they saw troops, and again at 12.30 they were still at the same game. Therefore when you read of concentration of fire in the campaign of 1870–71 it is as well to bear in mind that they did not apply then what I should call technical concentrations on certain points. As to firing over the whole line that bears upon us I think that is absolutely necessary. I cannot agree with Colonel Maurice as he said in another paper, "As to the fear that other guns will fire at me with appalling effect because they are not being fired at at all, and they can, therefore, range on more at their leisure, is, like the other, a peace nightmare."

Personally I should prefer not to be fired at, as I think I should make much better shooting if I were not. Gentlemen, that is my defence of the views I put forward. May I refer back to the quotation from Hoffbauer that Colonel Maurice read out? He said that my quotation was that the German batteries concentrated their fire upon the position as they considered necessary, but Colonel Maurice omitted the last sentence, in which the gist of the whole lies, which was:—"The German guns had previously established their great superiority over the enemy's artillery." This makes all the difference in the world to the sense of the quotation. They had established their great superiority over the French, and, therefore, they could do practically what they pleased.

As we are taught that the very soul of defence is a counter-attack, I should like to say something about the views that Colonel Maurice has put forward on the question of concentration and avoidance in a very interesting article on "Nelson and Pitt." The theory is based first of all upon the action of Nelson in naval actions; that he concentrated his fire upon a certain portion of the enemy's line and practically annihilated it. To begin with, that seems to me not to apply, because Nelson first of all had to manœuvre for the weather gauge which practically put half his enemy's line out of action. And, again, it does not apply because ships while manœuvring can fire, and while we are manœuvring we are worse than useless, for we cannot fire; at least, until we are provided with movable platforms, such as were used by the Nawab's guns at the battle of Plassey.

Avoidance must be connected with manœuvre. It is rather suggestive of your

[1] "Froeschwiller de Chalus," p. 95.

enemy remaining absolutely passive and allowing you to walk round him, like a cooper round a cask.

I do not quite see how we are to do much towards that. If you take the map of any great battle-field in 1870–71 campaign and look at it, you will find that from one side to the other there is, practically, a long line of guns; where there are no guns is generally due to the fact that the ground is not suitable; so much so that, in certain actions, you will find batteries standing out of action because there was no room for them to deploy. Where, then, is the room to manœuvre from flank to flank and avoid fire? There is also a very respectable authority, Prince Kraft, who says that the right place is as close in as possible. If you do not go in as close as possible you are in the wrong place, and if you go in too close you are again in the wrong place, because you would be wiped out. I am speaking now of large bodies of artillery, but in questions of small bodies of artillery, if you go manœuvring about to avoid fire or to concentrate your own fire without incurring that of the enemy you either go further forward and get into trouble, or else you hang back and retard the advance of the infantry, or if you go off to a flank you draw them off in a wrong direction to protect you.

I am sure that if a Divisional Commander came up and found artillery manœuvring in that way and was told they were manœuvring to avoid fire, the language that the Brigade Division Commander would have to stand from his Divisional General would be worse than the fire he would have to stand if he went into action and took his chance.

The Chairman.—I should like to say that so far from this subject of concentration and distribution having been thrashed out in the feeling of the Regiment, within the last few days we have received a paper on the subject from an officer who has thought much on the subject, and which I am sure you would like to hear.[1] I shall not mention his name because by the rules of the Institution we are not allowed to publish papers until they have been submitted to the Committee. I merely bring forward the fact as a proof that I do not think the Regiment is quite at one on this question of the concentration of fire.

If no other gentleman wishes to discuss the question I will call upon Major Hughes to reply.

Major A. J. Hughes.—With respect to the various remarks that have been made I do not think there is very much to say now.

As to the carriage of portable magazines, which was mentioned by Colonel Scott, I think Major Flint, who has them on the limbers, told me that very often, what I have said in my lecture, about the limbers going away with the portable magazine occurred, and although no doubt having cases on the carriage where you can carry two rounds does away with the necessity, perhaps, for having the magazine up at once, still as long as they are on the limbers the gunner may have to run, perhaps, a quarter-of-a-mile with them, and that would be a fatiguing thing to do.

With regard to the markings for tangent scales, what I specially meant was to have graduations; I did not quite mean that they should be actually marked by the figures in yards, but I meant that the hundreds of yards should be marked in figures and that you should have a half mark, say, for the 50 yards, and a dot for the 25 yards—that would certainly make the setting of the sight much easier for the men, but, of course, to do that the sight radius must be lengthened and the foresight would have to be put upon the muzzle—it is no use trying to crowd figures into a small space, and this is probably the reason of the Indian

[1] Since this lecture was delivered the new edition of "Field Artillery Drill" has appeared; the Committee R.A.I. think that it deals so clearly with the question of concentration of fire that no further discussion is at present necessary. They have, therefore, determined not to publish the excellent paper referred to by the Chairman.—*A.J.A.*

objection to having the hundreds of yards marked on each division, the present scales being so very short.

With regard to the clinometer I did not mean to disparage the Watkin one, but it is made with a drum, and being made with a drum I believe it must either be marked in yards or degrees, that it cannot have the two markings on the drum. That was the chief reason of my objection to it; and also, I believe, that the Mark II. clinometer when it is carried in the limber for any time is jolted about, and when it is taken out if the battery uses it at once it is quite useless. It is a very good clinometer provided it is adjusted, taken out, and used, but if it is trotted about for some time the drum shakes a good deal.

With regard to the question why we cannot carry fuzed shell, I am afraid I cannot answer it. I must refer Colonel Maurice to some one else.

Colonel C. E. S. Scott.—The system of carrying fuzed shell is under trial at the present moment.

Major A. J. Hughes.—With regard to the other question raised by Colonel Maurice as to distribution, I think I cannot do better than leave it in Major White's hands. I certainly agree with everything that Major White says about it, and I think a great deal of good has been done by having the discussion, and also that the quotation given by Major White, or rather the finish of the quotation, namely, "that the German guns had previously established their great superiority over the enemy's artillery," explains my belief in it, and shows that the advocates for "distribution" do not discard "concentration" against the tactical point at all. It is a great thing, of course, to get concentration when it can be obtained by superiority of numbers.

There is one thing also that, perhaps, has not been mentioned, namely, the difficulties about turning the fire of a Brigade Division from one place to another. It is easy to say that one switches the fire first on one battery and then on another right along the line; but each switch takes nearly five or ten minutes during peace time, and whenever a switch takes place you lose so many rounds, because if you fire battery to battery you keep up your fire more regularly and you fire considerably quicker than when you have to go scattering or turning fire from one part of the target to the other, and as a consequence one gets many more rounds into the target battery. If you take the case of three batteries against three, one Brigade Division concentrates against one battery while the other fires battery to battery, or each battery on the centre section of the opposing one. The three batteries who fire on the centre sections will in a certain time fire considerably more ammunition than the batteries who turn their fire first from one to the other, and this extra ammunition that they fire should certainly quite make up for the concentration that will be obtained by the other three batteries turning their fire from one to the other[1]

Gentlemen, I have to thank you for the kind way in which you have listened to my lecture.

The Chairman.—I am sure we have great pleasure in thanking Major Hughes for having come here, and for his able and interesting lecture.

[1] It was, I think, this consideration and the fact that officers and men are human, and human nature is to hit the person who hits one back; and, further, that a Commanding Officer's hands should not be tied to concentrate on all occasions, so much depending on circumstances that led to the opinion (the deliberate opinion, speaking of war, of over 90 per cent. of field officers at Okehampton) quoted in the lecture, which opinion agrees fairly with "Field Artillery Drill," as in Chapter IV., talking of the artillery duel, the wording is, "May be concentrated on individual batteries of the enemy in succession." Thus giving the Commanding Officers a free hand, and again, "Batteries must be detailed to keep down the fire of guns continuing or renewing their fire." The latter also upholds Major White's opinion of the "peace nightmare."

Dec. 4th.	Orleans retaken by the Germans from Metz, assisted by the Grand Duke of Mecklenburg and von der Tann's Bavarians. Consequent separation of the French Corps on the Loire.
Dec. 8th.	Fighting at Beaugency-Cravant, victorious offensive by Chanzy.
Dec. 9th.	French try to turn the German right from the forest of Marchenoir, severe action all day.
Dec. 10th.	Germans again attacked.
Dec. 11th.	Very clever flank retreat by the French to the Loir. French occupy a good position at Freteval.
Dec. 12th to 15th.	Germans march to the Loir. Chanzy retreats to Le Mans.
Dec. 16th.	Germans return to the Loire.
Dec. 26th to 28th.	French drive a German force from the Braye to the Loir.
End of December.	Obvions to Germans that Chanzy's forces

MAP TO ILLUSTRATE GENERAL CHANZY'S OPERATIONS.

December, 1870 & January, 1871.

SCALE 1:320 000.

15 0 0 5 10 15 20 25 ENGLISH MILES.

10 0 0 10 20 30 40 KILOMETRES

Dec. 4th. Orleans retaken by the Germans from Metz, assisted by the Grand Duke of Mecklenburg and von der Tann's Bavarians. Consequent separation of the French Corps on the Loire.

Dec. 8th. Fighting at Beaugency.—Cravant, vigorous offensive by Chanzy.

Dec. 9th. French try to turn the German right from the forest of Marchénoir, severe action all day.

Dec. 10th. Germans again attacked.

Dec. 11th. Very clever flank retreat by the French to the Loir. French occupy a good position at Fréteval.

Dec. 12th to 15th. Germans march to the Loir. Chanzy retreats to Le Mans.

Dec. 16th. Germans return to the Loire.

Dec. 26th to 28th. French drive a German force from the Braye to the Loir.

End of December. Obvious to Germans that Chanzy's forces must be attacked and beaten forthwith.

Jan. 1st to 6th. Movement of the Germans of the 2nd Army from the Loire to the Loir. XIII corps at Chartres. A large force of cavalry employed.

Jan. 6th. Germans advance from Loir and Chartres. Skirmishes at La Fourché, Azay, Mazange, St. Amand.

Jan. 7th. Combats at Epuisay Sargé, Villechauve.

Jan. 8th. Combats of Belléme, Vibrage, Vancé, Ruille, Ville Porcher.

Jan. 9th. Combats of Connerré, Thorigné, Ardenay, Chahaignes, Brives, Chateau-Renault.

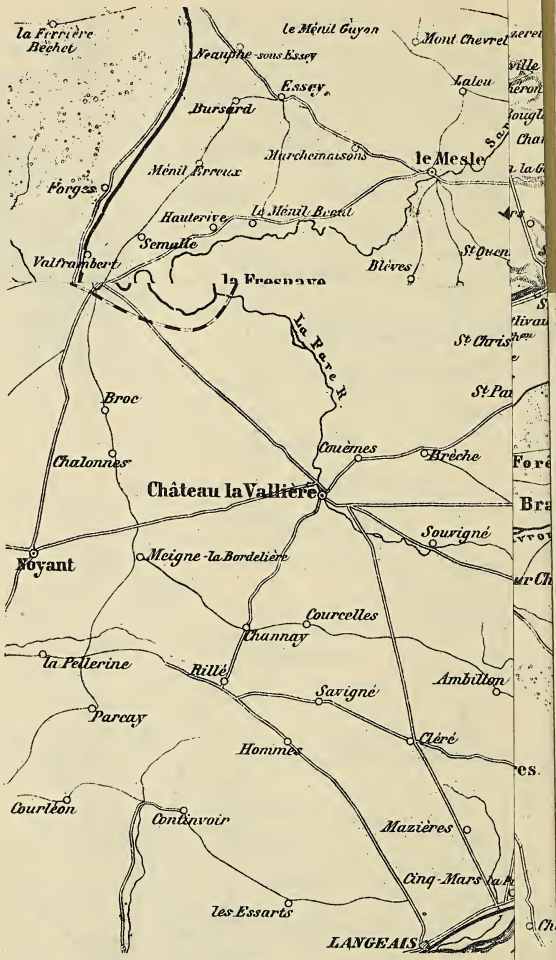
Jan. 10th. Battle of Le Mans:—Engagements at Parigné l'Eveque, Changé, Le Chene, Chanteloup.

Jan. 11th, Battle of Le Mans, (*continued*):—Champagné, Auvours heights, Le Haut Taillis, La Landriere, Le Tertre, Le Chene, La Chapelle, St. Celerin, Les Mortes Aures, La Tuilerie.

Jan. 12th. Battle of Le Mans, (*continued*):—St. Corneille, La Croix, Le Tertre, Les Epinettes. Street fighting in Le Mans.

Jan. 13th, Retreat in the directions of Laval, Conlie and Alençon.

Thom. Edin. Woolwich


la Ferrière Bêchet
le Ménil Guyon
Mont Chevrel
Neauphe-sous-Essey
Essey
Laleu
Bursard
Marcheménsons
le Mesle
Ménil Erreux
Forges
Hauterive
la Ménil Bucard
Semille
Valframbert
Blèves
St Ouen
la Fresnaye
La Fere R.
St Christ
Broc
St Pa
Chalonnes
Cuèmes
Brèche
Château la Vallière
Souvigné
Noyant
Meigne-la Bordelière
Courcelles
Channay
la Pellerine
Rillé
Ambillon
Savigné
Parcay
Cléré
Hommes
Courléon
Continvoir
Mazières
Cinq-Mars
les Essarts
LANGEAIS

GENERAL CHANZY'S CAMPAIGN; LOIRE TO SARTHE.

DECEMBER 1870 TO JANUARY 1871.

BY

T. M. MAGUIRE, ESQ., LL.D.

(Inns of Court Rifle Volunteers).

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(A Lecture delivered at the Royal Artillery Institution, 1st November, 1893).

LIEUT.-COL. H. PIPON, R.H.A., IN THE CHAIR.

CHAIRMAN—I do not think there is any occasion for me to introduce Dr. Maguire to you, so I will call upon him to deliver the lecture which he has kindly come to give us.

DR. MAGUIRE—Colonel Pipon and gentlemen, the responsibility for the selection of the subject must, as usual, rest upon Major Abdy and his associates down here. He seems to me to think that inasmuch as on a previous occasion there had been a discussion here about the general arrangements of Gambetta from October 1870 to February 1871, it might be desirable to enter into more detail with regard to one particular phase of the operations under the direction of Gambetta: whose oratory was to French generals and soldiers what the strains of Tyrtæus were to Grecian heroes.

But before entering upon the proceedings of the very illustrous French General Chanzy, whose name will ever be green in the memory of his countrymen, and very justly, it might be well to indicate the circumstances which brought him into strategical and into tactical prominence.

On the 19th September, 1870, after overwhelming the regular armies first—taking one regular army prisoner at Sedan, and shutting up another regular army at Metz—the Germans invested Paris; the third German army invested it on the south, the fourth German army invested it on the north. There was not available for other purposes in France then any very considerable number of German forces; the first German army was around Metz; the second German army was around Metz. Von Werder was first at Strasburg, and ultimately he came down to Dijon and towards the Côte d'Or and invested Belfort. The German forces were—Von Werder's Corps, afterwards named the 14th; two German armies at Metz, two German armies at Paris, some Germans along the line of communications, and nobody else available. Under those circumstances Gambetta determined to get a kind of *levée en masse*, somewhat similar to that *levée en masse* which in 1793 was, as Napoleon points out, falsely supposed to have delivered France. The

main body of the French assembled south of the Loire, broadly speaking, from Nevers to Tours, under General d'Aurelles de Paladines; another body assembled north at Amiens, first under Bourbaki then under Farre, and ultimately under Faidherbe. These were the forces then with whose aid Gambetta proposed to so worry the Germans surrounding Paris, and to so threaten their lines of communications as to make them either abandon the siege of Paris or, by staying at Paris, risk destruction. Recent evidence proves the soundness of this plan and its practicability with better trained forces. However, the surrender of Bazaine at Metz on the 27th of October was fatal to the brilliant and daring rhetorician's plan. He was able to assemble two corps in the northern fortresses and down to Amiens; we shall not refer to these any more, except to say that, of course, the strategy of Chanzy was more or less determined by reference to the probable efforts of other Frenchmen in other directions, and was also determined or affected, as all strategy necessarily is, by national peculiarities, political prejudices and official caprices. Of course, if the Government is in the hands of a soldier, as in the case of Cæsar, Frederick or Napoleon, all these influences work in harmony.

I admired Gambetta in 1870 and I respect his memory. He was a splendid personality, but the Tours Government, afterwards the Bordeaux Government, was not in touch with many of the best Frenchmen, and many of the demagogues were incapable of political expediency or military foresight, and Gambetta himself was over-confident.

In November the small German force in Orleans was obliged to evacuate it, the Bavarians were beaten at Coulmiers on November 9th, and went north towards Artenay and Toury, and it was generally supposed by the French people (and their hopes were encouraged by some manifestoes by Gambetta) that the result of this must be that d'Aurelles de Paladines would push rapidly from Orleans by every road north on Paris and compel the enemy to raise the siege. The Germans were perplexed exceedingly and made uncertain movements. But their Commander-in-Chief disappointed them; he hesitated; he withdrew rather than advanced, and spread himself on both sides of Orleans from Beaune la Rolande to near Châteauneuf. The Germans came from Metz, three corps, and they already had the Duke of Mecklenburg and Von der Tann on the right of their theatre of operations. The Duke of Mecklenburg-Schwerin was near Châteaudun; Van der Tann was between that and the Orleans and Paris road. Three French corps came up against them, the 15th, 18th, and the 21st, and part of the 19th; other three were more to the right, near the forest of Orleans, the 16th, 17th, and the 20th. Thus then, as D'Aurelle was proposing a movement north from the Loire towards Paris, three corps after the surrender of Metz came south-west. Those three corps were, from right to left, the 9th Corps, the 3rd Corps, and the 10th Corps. This entirely upset the whole French arrangements, and then a most singular event occurred—the whole French forces were absolutely cut in two, after a series of battles from the 28th November to the 4th December, and the Germans re-entered Orleans on the 4th December. As I said, the French Corps were cut in two—three of them came south of the Loire and eastwards, the

15th, the 18th, and the 20th; others came between the Loire and the Loir. I have not sufficienct delicacy of French pronunciation to audibly discriminate between Loire and Loir—the right one is the Loire and the left one is the Loir (describing the position on a blackboard). Between these two, the Loire and the Loir, were the 16th, 17th, and 21st Corps, and part of the 19th; along the Loire, and south of it and to the east, were the 15th, 18th and 20th. These three latter were ultimately known as the army of Bourbaki, and after an attempt on the German communications of a very feeble character, and a kind of rush to raise the siege of Belfort, they were driven into Switzerland, where they were obliged to put themselves under the shelter of neutrality on the 2nd of February under most deplorable, most harrowing conditions. With them again we have little or nothing todo, except so far as they influenced the policy of Chanzy.

Now we come to Chanzy himself. As I said, the three corps, the 15th, 18th, and 20th went east under Bourbaki. Three, the 16th, 17th, and 21st retreated, as the Germans thought, towards Blois under Chanzy. By this time Chanzy had so distinguished himself as to obtain the entire confidence of Gambetta, who was practically the military Dictator of France and of the Tours Government[1]; and I may just as well tell you who Chanzy was. He was born at Nouart in the Ardennes, well known in connection with the campaign of Sedan, just up here above Verdun on the left. He served in Algeria; he served in Italy in 1859; he served in Syria; he was not involved in any of the transactions on the north-east, Woerth or Gravelotte, or Sedan. He, like many officers from Algeria, helped the Government of National Defence, and he was put in command of the 16th French Corps during the operations to the north of Orleans. He now, about the 5th December, got command of the 16th, 17th, and 21st Corps. The officers in command of these respectively were in the Le Mans campaign—Admiral Jauréguiberry, General de Colomb, and General Juares. He very soon puzzled the Germans, and made himself remarkable in a great variety of ways. The Germans, as I said, were the 9th, the 3rd, and the 10th, originally stationed from the Orleans and Paris road to Beaune la Rolande. But on the right the Duke of Mecklenburg had the 13th[2] Corps and the 1st Bavarians. These came to the forest of Marchénoir, which is marked on the hand map which your Committee have been good enough to provide.

In the centre, the forest of Marchénoir: near it to the right Cravant, Beaumont, Josnes, and a lot of other places. When the Germans were going down towards Blois they came to Meung to reconnoitre and found themselves stopped; they were stopped on the 6th and 7th December; they were involved in a great number of village actions; there was a considerable amount of artillery fighting[3]; they were stopped at these

[1] Gambetta had escaped out of Paris in a balloon and, after a remarkable display of gallantry under fire in the air, had early in October established a fairly efficient new government in Tours.

[2] A mixed corps, consisting of the 17th and 22nd Divisions, which in the ordinary course of events would have belonged to the 9th and 11th Corps.

[3] Artillery officers will not find lessons in the Le Mans campaign as to the grouping of artillery such as are abundant in the early part of the war, but they will find many cases of admirable skill in the use of a battery or a division. *See* Appendix.

village actions and could not press on. The weather was deplorable—exceedingly cold, frosty, &c. The French proved themselves, under able guidance, exceedingly effective defenders of localities. I now quote from a German authority: "Some people thought that the fights for localities, such as villages, farm-houses, &c., would be over with the introduction of breech-loaders; they were mistaken. These fights were more numerous than ever, because skirmishing tactics entail the necessity of taking advantage of every accident of ground, great and small. In order to get full value out of the breech-loader, each army was led to attach great importance to the occupation of the boarders of woods and villages, which was doubtless right." Therefore, the forest of Marchénoir and the neighbouring country, and all the little villages that you see scattered on the map from Marchénoir to Beaugency, were the scene of most obstinate and deadly combats from the 7th December to the 10th inclusive. Consequently the 13th and 1st Bavarian Corps advanced only slowly, but, of course, the right of Prince Frederick Charles' Corps of the 2nd German Army gradually closed up. But this manœuvre gave a chance to Bourbaki's eastern corps, if they dared, to assume the offensive, and perhaps to get up towards Paris by way of Montargis and Auxerre and to cut the German communications and reduce the invader to desperation. I remember reading that France was to be the "grave of Germany." Bourbaki did not move; he had not confidence in his material; he had not confidence in his troops; he had seen how they fought and he was afraid to risk a general action, as there were two other German corps now available since the siege of Metz, the 2nd and the 7th, who might have come and stopped his movement. In point of fact, they afterwards turned against Bourbaki and conduced to drive him into Switzerland.[1] But manifestly bringing the Germans west was a good piece of strategy on the part of Chanzy, and for that, if for nothing else, in such a crisis he deserves credit. Nothing could be more obstinate or deadly than the fighting in this bit of ground between the forest of Marchénoir and Beaugency. I do not care much for dwelling upon pathetic descriptions; I never would dream of doing so to Volunteers or to people about to enlist; but as you have committed yourself definitely to the art of war it will not frighten you so much as it would some others: the scenes in Beaugency immediately after its capture were painfully memorable. The night was very starry and the rattle of the musketry never quite ceased. There was also a good deal of desultory firing about the streets by Prussian patrols, who sometimes caught sight of the uniforms of French soldiers who had brought in wounded comrades and were endeavouring to rejoin their corps. The whole town was a vast hospital. Here the Temple of War had its second face like the Temple of Janus. There was only one doctor capable of performing amputations! In the theatre alone were upwards of 200 desperately wounded men, forming a scene which those who speak lightly of war, or who hold in their hands the power of making it, should have witnessed. For many hours there was no medical man in the place. The cold was intense,

[1] The skilful use which Manteuffel made of the 2nd and 7th Corps against Bourbaki's left flank and rear in the end of January 1871 is one of the most memorable episodes of military history.

and many a man's life slipped away because there was no one sufficiently skilled to bind up his wounds. The dead lay thick among the dying.[1] I think it is not desirable to go on piling up the agony, but there is one little point I would just mention, and now I quote Hozier: "It will always be a satisfaction to the subscribers to the great English fund for the sick and wounded to know that numbers of the French were spared unutterable torture and owed their lives to the supply of English chloroform, blankets, bandages, and wine which was fortunately forthcoming!" I need scarcely say that for all that the British, like other philanthropists, got no thanks from the parties concerned. Recently French orators and authors have informed us that 25,000 well equipped soldiers would have been worth all the bread and cheese and doctors in England.

Well, after the 10th December the Germans imagined that Chanzy had retreated south, and you will admit that his ability in regard to this deserves commemoration; they thought he had retreated south towards Blois, and indeed the 10th German Corps followed him there. Now, he must have managed his plans exceedingly ably to have an army like the Germans pursuing him in the direction of Tours, whereas in point of fact he had retreated to the west to the river Loir—they pursued him by the right of the Loire. But he had retreated to a place between Vendôme and Fréteval. He had thus brought a young army by a flank march right out of the way of a veteran army like the Germans, and had put his army on the river Loir from Vendôme to Fréteval and Morée on the flank of the Germans, and was, therefore, as near Paris as they were. They were immediately compelled to turn again to the west; they turned almost worn out from the Loire to the Loir. (Describing the same on the blackboard). Chanzy's position was very strong indeed; it was a kind of salient, like that by which Marmont puzzled Wellington in 1812 on the Douro. The river Loir, is in a close country full of villages, woods and other obstacles marked on your map; and he, therefore, would be in a salient angle as against the Germans, about Morée, Fréteval and Vendôme. He proposed to stay there for some time and to occupy their attention. He pressed again and again on the Central Government in a series of very able despatches[2] the necessity of Bourbaki not going too far east, but keeping near enough to the German army of the Loire to occupy them and to slip north of them, and so to get up towards Paris; and to combine this with the proposed sortie by General Trochu from the invested capital. I hope, gentlemen, I make clear to you the situation: that Bourbaki's three corps being reinforced by other troops from Lyons and different parts of France still available, from all parts of the south-east, might make a mighty army of 160,000 or 170,000 men, and that Chanzy on the river Loir would occupy Mecklenburg, and the 9th Corps, under Manstein, the 3rd Corps under Alvensleben, and the 10th Hanoverian Corps under Voigts-Rhetz, not to speak of five divisions of cavalry; while

[1] For fuller and eloquent details *see* Hozier's narrative.

[2] In what I consider most able despatches, written with that elegance and clearness that illustrates and, since the days of Froissart, has illustrated all French military literature. It is a lesson in manhood to follow the deeds of the Teutons, but brightness and glory pervade every page of the brilliant soldiers and journalists of Gaul. *See* Appendix.

Bourbaki, by going against the communications up towards Paris, on the east thereof, would otherwise seriously embarrass the Germans. It is hard to say who is to blame for the failure of that idea. Certainly not General Chanzy[1]; certainly not General Bourbaki—possibly the Central Government, and more than probably the condition of the army: bad officers and ill trained men; because, of course, the mass of the officers of the regular army were now in Germany—400,000 regular soldiers, after the capitulation of Sedan on the 1st September, and the capitulation of Metz on the 27th October, were in Germany itself, and there was no tried system of organisation available.

We have had two phases of Chanzy's arrangements. First, as significant of his qualities as a Corps Commander of the 16th, and then as an army leader, fighting obstinately for three days, stopping an army flushed with victory, and who expected nothing less than a fight—stopping them at the positions between the forest of Marchénoir and Beaugency. I wish I had time to give details; I have them here, and, if permitted, perhaps I may supply them later on, but I have not time at present. The next thing is his flank march whereby, from looking north he looked east on the right rear of the men who were attacking him a few days before; that is to say, his proceedings, December 11th to 12th, the very clever flank retreat by the French to the Loir, and the occupation of the good position at Fréteval.

The next feature is the retreat of the French army to Le Mans, and the fourth and final phase is the battle at Le Mans.

Now, why did he retreat to Le Mans—from the Loir to Le Mans? Well, some writers say for strategic reasons: that the further he drew these Germans west the greater portion of France he left open to the operations of such other levies as Gambetta could organise. That is quite clear. If he had that strategic idea in his mind well and good, but it does not appear from his own book that he was influenced by it only.

The German official account,[2] is a monumental book, but an exceedingly difficult book, and a book burdened with details and utterly lacking in narrative power. I am sorry its translation should be used as a text-book in England, because I do not believe that even in Germany it is used for ordinary study—I believe it is used as a book of reference; but it does not appear to me that it was necessary for the information of Englishmen to set forth every single detail of all the German proceedings at every one of these battles—each company, each battery, and so on, although, of course, there may be something to be said for this, in so far as the original was written for Germans. Meantime I cannot discover in the least from its pages what was the real motive of action of Chanzy; but I think his own book, although he does not tell the motive—perhaps for some subtle reason—will explain his movements. It was absolutely necessary to get some place in which these young levies might be further organised, re-dressed, fed

[1] In the Appendix will be found several of Chanzy's powerful letters quoted in their entirety.

[2] I quite admit with Captain Grierson that for Germans all the details of the official account are valuable, but it seems unreasonable to ask English officers to learn by heart much more about German battalions at Gravelotte or St. Quentin than they know about English battalions at Vittoria or Waterloo.

and made comfortable, &c., and that place was manifestly Le Mans, which, as you see from the map, had many advantages. Look to your map for Le Mans; between the Germans and this town was a country exceedingly difficult to traverse which would delay the Germans while the French about Le Mans were getting reorganised and refreshed, supplied with ammunition, and so on; moreover, it was near abundant supplies—Cherbourg, Brest, great depôts and arsenals—and the officers commanding at Le Mans could be supplied and could move by means of all four railways which you see—railways to Paris, railways to Alençon, Laval, and the south-west, could get any number of recruits up. In point of fact they did get up some 20,000 recruits, and some military stores from England and from America; there was no deficiency in military stores, there was no deficiency in ammunition; there was abundance, a marvellous abundance, of provisions. All these things were forthcoming. Officers, organisation, military training were not forthcoming. Chanzy thought he would give them a good opportunity of getting what we call "licked into shape" by retiring to Le Mans. But Frenchmen do not appear to be of a retiring disposition, or to do well under circumstances of retirement; and I believe no young troops in any country do well under those circumstances. For example, if you take the American Civil War you will see that in 1861-2 a defeat very frequently meant a rout on the part of the Northern levies.[1] And the sufferings of the troops made things worse. I have here a quotation from Chanzy's book, in which he points out the very deplorable features that characterised the retreat from the Loire to Le Mans—a retreat which reminded many literary men of Napoleon's retreat from Moscow as to the severity of the weather and the miserable condition of the young soldiers.[2] Between the Loir and Le Mans the country is like parts of the south of England. There are abundance of small rivers; there are not large mountains, but there are plenty of places about 200 feet high, 170 feet, and so on; the roads have a great tendency to become defiles; there are any amount of orchards, vineyards, villages, homesteads, farmsteads, and so on scattered through a country of considerable fertility and old cultivation. Necessarily, therefore, the Germans, who had a great superiority in cavalry and artillery, would not be able to use such a territory for their forces as well as other parts near Paris. With that idea Gambetta himself agreed, for he wrote saying:—"I quite agree with you in not coming out into the open. If with your soldiers you come out into the open, say, beyond the mountains of Perche up north-west, you are certain to get overwhelmed in the plain; but if you can only get into close country you may possibly be able to neutralise the German cavalry and the German artillery." I may mention that the German infantry was about 58,000 strong, the German cavalry about 17,000 strong, and the German guns about 324. The French cavalry was of small account; the French guns were numerous, but I am afraid the French gunners left much to be desired with regard to their training; I do not mean to say the French gunners generally, but the particular men employed in this part of the campaign.

[1] *See* General Lee's remarks on the effect of a flank attack on Federal levies in 1862.

[2] *See* Appendix.

About the 15th of December Chanzy withdrew from the Loir to Le Mans on the Sarthe, at the junction of the Sarthe and the Huisne, and as he withdrew he left three divisions to detain the Germans. The distance from Vendôme on the Loire to Le Mans is about 40 miles; the distance from Orleans to Paris is about 75 miles; the distance from Le Mans to Paris is about 110 miles. Chanzy determined, if he could worry out the Germans, to move to Paris at once, and with that object he collected any amount of supplies and stores to hand over to the army that, according to the plan, would have escaped from Paris, and would naturally be lacking in provisions. One French division (Curten's) came up towards Château Renault and St. Amand, Jouffroy's was near the Loir, another under Rousseau was near Nogent-le-Rotrou and on the right bank of the Huisne; consequently there were three detaining forces, one on the left flank of the German movement, one in front of the German movement, and the other against the right flank of the German movement.

What was the German movement? A great enveloping movement, not on such a great vast scale as at Sedan, of course, but with the object of closing in on the French and cutting these railways which you see marked, nipping them if possible—at any rate compelling them to evacuate Le Mans and go further away from Paris. And Paris was the whole object of the Germans. They did not want to conquer France, but they wanted to render it utterly out of the question that any French force from any quarter should break the investment of Paris. Now, these German troops were thus situated about the 4th of January: the 5th and 6th Divisions of the 3rd Corps, Alvensleben's, between the Loir and Orleans; the 18th Division, Hessians, at Orleans; the 19th Division at Blois—that is the 19th Division of the 10th Corps; and the 20th Division of the 10th Corps at Vendôme. These had a great force of Cavalry, 6th and 1st Cavalry Divisions. On the extreme right were the 5th Division of Cavalry, next the 4th Division of Cavalry, then the 13th Corps at Chartres, composed of the 17th and 22nd Infantry Divisions, and then the 2nd Cavalry Division. The 13th Corps was to move to Illiers, then to Nogent-le-Rotrou (pointing out the same); and then it was to cross the river Huisne, and, supported by the 4th Cavalry and a brigade of the 5th Cavalry, to come on the right of the river Huisne towards Le Mans and to threaten the left rear of Chanzy's corps. The 3rd was to push rapidly across the river past Chanzy's old position between Vendôme and Fréteval, past the little river Azay, pass the little river La Braye and the river Anille on to the river Le Narais, from Parigné l'Evêque to Ardenay. I am sorry to trouble you with somewhat puzzling names of places, otherwise unknown to fame, but we must follow Chanzy, and to get at him we must mention the meeting places towards which the Germans converged. The 10th Corps was to come along by Montoire, La Chartre, and Grand Lucé. As I have said, the French object was to get away up towards Paris by Chartres; the German object was to head them in this direction to attack them between St. Calais and Le Mans, and to cut them off from other districts, north-west and south-east. The French detaining action was good so far as Jouffroy was concerned. The Germans, of

Stülpnagel and Buddenbrock's divisions, were kept from the 6th January, when they were on the Loir, to the 10th January, before they got beyond Ardenay and Parigné. The battle of Le Mans began on the 10th and lasted during the 11th and 12th.

Now this was a most wearisome pilgrimage for all parties concerned, a more disagreeable advance could scarcely be conceived. From the 4th to the 6th the weather was so severe that locomotion under ordinary circumstances would not have been attempted; on the 7th there was a thaw, that was the other extreme; on the 8th there was a very severe frost; on the 9th the whole country was covered with ice, horses were slipping and falling about the roads in all directions, and the Commander-in-Chief of the Germans, Prince Frederick Charles, went part of the way in a limber, and part of the way walked twelve miles to encourage his troops along, like Hannibal, able to endure the extremes of heat and cold. The brunt of the business fell on the Brandenburgers, the 3rd Corps; they had come from about Berlin, where they were in the middle of July, and they went 750 miles to Le Mans, into which they entered on the 12th and 13th January of the next year. They had marched in France alone a matter of about 325 miles; they had fought at Spicheren and at Rezonville; they had taken part in the investment of Metz to the end thereof; and here they are now operating between Orleans and the Sarthe. You might be interested in having a description of the nature of the country and the difficulties in the way of the army, and of one day's march by the Germans. I am afraid I must trouble you to listen to a quotation, although reading in a lecture is not very interesting :—"The whole army now (January 7th) passed into the district between the Loire and Sarthe, which consists partly of small plateaux, partly of a labyrinth of ridges, which not infrequently attain a relative height of 200 feet or more. Well filled rivers flow with rapid course through valleys which are generally broad and with steep sides. The entire country is covered with the densest cultivation of long standing growth, with vineyards, orchards, and vegetable gardens. The villages consist mostly of a number of isolated and solidly constructed farmsteads, among which are interspersed châteaux, surrounded with extensive park enclosures and copses. Owing to the extensive sub-division of the land customary in the country, every property is surrounded by hedges, ditches, and walls" (very different indeed from Belgium for example). "There are consequently numerous positions and isolated points at which even moderate troops" (and the French troops under Jauréguiberry were exceedingly moderate) "could defend themselves behind good cover. Although the superior effect of the Chassepôt here ceased to avail, the mitrailleuses were in their true element" (this is the only thing that is specially interesting to artillery officers) "and became a dangerous weapon in the narrow passes. Even the commanding points seldom offer a free view to the assailant. He must abandon all idea of any planned deployment of large bodies, especially of cavalry and artillery. In the actions before Le Mans the latter could seldom be counted by batteries, mostly only by divisions or single guns. The action of the cavalry was limited to the roads, and the infantry had almost

exclusively to bear the burden of the struggle"—in point of fact, the German cavalry did very little at all; the only cavalry that did much was the 14th Cavalry Brigade (Schmidt's) of the 6th Cavalry Division: "It follows that in such country, the control of the higher Commanders is rendered very difficult, and that independent initiative must be demanded of every leader." I do not know how far you will be inclined to apply those remarks, taken from the German official account, to the circumstances of your own country in the event of invasion. It might be a good lesson to try, for the several arms could be handled between Dover and London step by step.

Now, how the Germans, thus hampered by the nature of the country, by snowdrifts, sometimes by fogs, by mitrailleuses and by infantry, managed to advance at all is the next question. Another peculiar point of this campaign was the limited length of the day available for marching. Some people ridicule the Germans because they only went 40 miles between the 6th and the 10th, in fact less than 40 miles; but then they had not the whole day for the march; they could not begin till the forenoon was far advanced. Why? Because it was utterly impossible to bivouac—the weather was so exceedingly bad. I do not know whether you were in this part of the world at the time, but I was, and I remember it very well, and I thought it was probably the severest weather that I ever went through—that December and that January. The Germans could not possibly let their troops bivouac, and, according, each night they managed to find shelter somewhere, and therefore they had to march from the fighting ground, as it were, to the sleeping ground, and then in the morning they had to march back again from the sleeping places to the fighting places. And this was in January in a very bad year, and practically the work or the actions would begin, say, at 11 o'clock and would end between 3 and 4 o'clock. There is an account by a distinguished British officer of what he saw one mid-day, and if you will allow me I will read it, because I cannot pretend to give as good a description from my second or, I should say, third hand information as this gentleman did who was through all the campaign. We are now on (pointing to a map) the 8th of January. You will see the routes yourselves from (1) Vendôme to St. Calais, St. Calais to Bouloire, Bouloire to Le Mans; (2) La Chartre, Château Du Loir, Lucé, Ecommoy; (3) Illiers, Authon, Bernard La Ferte—such were the lines of the different columns. I may tell you that the 18th Division practically became the reserve of the 3rd Corps. Another thing that will show you how difficult it must have been is that on this analysis at the right of the hand-map, you will see a number of engagements, and they are not one-half of the actions of each day: "Imagine a straight road" (says this English officer in his account) "leading over a succession of round hills; on either side of it a rich country, dotted with farm-houses, cottages, orchards and walled gardens, hedges (exactly like those of England), and occasional woods. In fact, Kent and Surrey combined, with vineyards instead of hop gardens, would be an exact picture of the country through which the Germans were pushing on, under all the disadvantage of the fog, in a land never seen before" (and which I suppose they never wish to see again). "The

column was led by a small detachment of cuirassiers. After these came three infantry soldiers, two of them about 150 yards in front of the column, and one behind to connect these foremost men with the detachment of infantry which followed. The three foremost soldiers of the German army in face of the enemy were accompanied by four pet dogs, trotting quickly along beside them. After the infantry detachment came a detachment of cuirassiers, then more infantry, all of the same regiment, and followed by the light battery of the advanced guard. Owing to the thick mist the troops moved cautiously, for they knew that the enemy might appear at any moment. The pace was a moderate walk, about three miles an hour, with occasional halts, to examine a farm or a group of cottages near the road. Right and left of the road were cavalry and infantry marching in pairs searching like dogs for game. They were generally concealed by the fog, but now and then a small party would peep out from a lane or cottage garden, and vanish again into the mist, when they saw that all was going smoothly, and that they had not lost their place beside the column. The troops marching along the undulating road had no reason to take thought for anything, save in front, as they had perfect confidence in the sagacity of their comrades, who, sometimes walking quickly, sometimes with rifle at the charge, were pushing on as well as they could over vineyards and gardens, ploughed fields and stubble, walls and fences, peering into every tree and bush for any enemy who might possibly be concealed by a copse, a garden wall, or a cottage. Occasionally one would run to the road and report something that had a suspicious look, when instantly some of his comrades were sent in the direction named to see whether any Frenchmen might be concealed there. All this was done so quickly as scarcely to interrupt the march of the column." I have some sketches of the little actions that under those circumstances took place at some of the villages all along this river Braye, which was obstinately contested, but, not to spend too much time over it, the result was that General Jouffroy was pushed gradually back.

An awkward thing at this point was General Curten's movement. When he came up *here*, towards St. Amand, he was manifestly on the left and threatening the rear of the 10th Corps. That delayed part of the 10th Corps and two cavalry divisions and he was in no danger himself, because there was abundance of railways, and when he wished he just went back a little and turned up where he pleased. In *this* difficult country, up about Bellême, the 4th Cavalry was easily checked—it did little in fact; also, in the country near Nogent and La Ferté Bernard, the 13th Corps was only able to move slowly. And then another curious thing happened: that whereas originally the Germans had intended to come on in a re-entering fashion with the 13th down on the right and with the 10th on the left (describing the same), when they came to fight the battles on the 10th, 11th and 12th, instead of being in a re-entering form they were in a salient form. I mean to say that they wished the 13th and 10th Corps on the wings to be in advance, as it were, of the 3rd, and all to make a kind of semicircle round Le Mans; but when it came to the fight the position was reversed, and the 3rd Corps was in the front and the

centre, and the 13th and 10th Corps were in the rear and the flank, which is a somewhat singular position. At Sedan, you may remember, by the banks of the river Meuse and its tributary the Chiers' the Prussian Guards, the 12th, 4th, 1st and 2nd Bavarians, the 11th, the 5th, and the Wurtembergers gradually closed round the French, surrounded and captured them. So the French, the 21st, 17th and 16th Corps retreated to Le Mans, and it was proposed that they should be pressed in and enclosed. But, in point of fact, at the beginning of the battle of Le Mans on the 10th, the proposed German combinations were not realised. Well, you might have imagined that this complete change in the whole disposition of the Germans would have been very embarrassing indeed to Prince Frederick Charles, the Duke of Mecklenburg. If you intended to attack from the concave—that you should be obliged by the force of circumstances—to attack from the convex would be perplexing. And Chanzy had little doubt that he would soon weary out Prince Frederick Charles by resisting day after day under such circumstances and in such weather, and that he would give up and return; and if he gave it up, then Chanzy would immediately go for Paris as quickly as he possibly could. I see that the time is nearly up. I must thank you for your attention—it is rather a dry lecture.

We must now come to the very position of Le Mans itself. *This* is the plâteau D'Auvours. You will observe that it commands the railway to Paris and the road to Paris, and you will observe that it is connected with the positions on the right of the Huisne, by Champagne and Yvré. It was absolutely necessary to take it. On the road, the Chemin des Bœufs, from Arnage up to the Huisne, see there were a number of divisions of the 17th and 16th Corps. The Germans never saw a better occupied position, and Prince Frederick Charles and Alvensleben might very well have abstained from attacking it; there were some 50,000 men in this position. It required constant attacks for three days consecutively before it could be carried. There were ready to attack it, from La Tuilerie, a very important part of the position, to the plateau of Auvours, only three divisions up in time on the 10th and 11th, these were the 18th of the 9th Corps on the right, then the 5th and then the 6th of the 3rd Corps. A description of how they attacked, and so on, it is quite impossible for me to read in the time at your disposal; but suffice it to say that they kept pounding away at the village of Changé and at the plateau D'Auvours. Every small farm-house was taken, and some were taken and retaken, and in some cases without making very much impression until, on the night of the 11th, the disadvantages of depending upon untrained Volunteers, or half drilled Militia or levées *en masse*, or anything of the kind, became painfully apparent to the French Commander-in-Chief, and through him to every nation in the world except, perhaps, our own. The defence of La Tuilerie was entrusted to those dragons' teeth that are supposed in every case, by mere doctrinaires and sentimental rhetoricians, to be ready to spring up fully armed the moment the invader crosses the frontier. Much better if they stayed as they were and earned money to pay trained men as a general rule. The Mobiles of Brittany were entrusted with the key of the French situation. The result was that

when the 20th German Division fired upon them they disappeared, as an American said, "like a mass meeting at its conclusion." They retired by rail, by road, in every direction. Chanzy said that this position must be retaken at all costs, because, with the Germans on it, Le Mans was untenable; and, moreover, disappearing to the rear is infectious, and if some one did not retake La Tuilerie, other divisions would also retire from other portions of the field. Well, Bouedec tried and he retired under the influence of a few shells. Jouffroy then retired. Next morning (the 12th) the 18th fired on Le Mans; the French began to fall back in every direction; the 4th German Cavalry came down towards Savigné; the 17th and 22nd Divisions on both sides of the river Huisne drove back the 21st Corps to the River Parance; the 10th Corps marched into Le Mans, and after them the 3rd Corps. Chanzy retreated in the direction of Laval partly, and partly in the direction of Alençon.

Thus, gentlemen, so far as the time allows, we have followed the transactions of this very able man struggling against adversity, and if "prosperity," in the words of Bacon, "doth best discover vice," adversity certainly doth best discover virtue. The military virtue of Chanzy and some of his subordinates, Admiral Jauréguiberry, &c., was remarkable, but the evils of want of discipline and training, and the necessity for making war a serious business, were very clearly demonstrated. We have followed Chanzy from Beaugency to the forest of Marchénoir, in his bold endeavours (December 7–10), in his able flank retreat from Marchénoir to the Loir, in his further retreat to the Sarthe, and in the vigorous defence, so far as he was concerned, of the positions in front of Le Mans. What is the lesson? The lesson is that in modern Europe it is utterly useless to trifle with the art of war, in fact, it is a science and an art combined, that if a nation wishes to exist no amount of money will save it. The French had money without any limit, not only then but soon after, to pay off all their debts in consequence of their war. Their numbers were legion; it is hard to tell how many Chanzy had; he probably had 150,000; in *these* positions he had 118,000 at any rate, and perhaps more; he was in his own country with the world to supply him, with patriotism at his back, and with a brilliant orator to kindle enthusiasm. Yet in the worst possible weather he was beaten by half his number, and many of these could not be engaged in the battles. They, moreover, had struggled up to him through his own country for 350 miles—the whole length of England. Is any other illustration wanted of the utter folly of taking the military art for granted, than the disappearance of three French corps and part of another, and 12,000 recruits and Mobiles from the strong position in front of Le Mans at the attack of a few divisions? Is any further illustration wanted of the madness of our people in playing fast and loose with their national greatness and with the teachings of history, or could there be any greater illustration of the selfish and base folly of Englishmen of the richer classes who think it desirable in the present state of affairs in Europe to play lawn tennis and billiards when they ought to be drilling and rifle shooting and leading their humbler fellow countrymen in the ranks of the Volunteers? As a Volunteer I have to thank you exceedingly for listening to me so patiently and so long.

DISCUSSION.

THE CHAIRMAN—I am sure Dr. Maguire will be very pleased, indeed, to answer any questions or reply to any remark upon his most interesting lecture. I am only sorry that he should have thought it necessary for a single moment to say that such a subject is "dry."

CAPTAIN GRIERSON—There are only two points upon which I should like to make a remark. The first is what Dr. Maguire said about the German official account. I rather think that an account which is compiled and given out officially by the Staff of the Army as a record of a war ought to contain a *précis* of everything connected with that war, and that, therefore, the Germans have not erred in going as far as they have into the details of the campaign of 1870–71. It is a historical record; I grant it is dry, I grant it is not a thing that you can sit down with your feet on the top of the fire-place to read; it is a work that you must sit down to study with maps and all that sort of thing, and it is a book of reference. In a book published after his death Von Moltke acknowledged that it was not a popular account. He said he had been urged by his relations to write such an abbreviated history as should be within the comprehension of all, and, although I am sorry to say that the English translation of it is not all that could be wished, still in it we have what I look upon as Moltke's *précis* of the official account, and it is to that I would refer officers who wish to study the strategy of the campaign and have not the time, or perhaps the inclination, to sit down to the more formidable study of the parent work.

But there is one question I would like to ask Dr. Maguire, with a view to pointing a moral. We have heard a great deal of late years of the absolute impossibility of the British Army ever taking part in wars in Europe outside of England, of British military forces having nothing more to say on continental questions, and of Great Britain having nothing to do with continental politics. I do not for a moment apprehend that we shall ever be engaged in war against Germany, but as a mere theoretical question of strategy I should like to ask Dr. Maguire, as he is a well-known authority in these matters, to give us his opinion as to what would have been the effect towards, I will not say the end of this campaign, but towards the time when the Germans started from Orleans to pursue General Chanzy towards Le Mans, of from 75,000 to 100,000 British troops being landed on the theatre of operations. It is rather outside the limits of the campaign, but as Dr. Maguire has talked about matters outside it towards the end of his lecture I should like to have his opinion upon what the effect of the arrival of an army, which would have been equal certainly numerically to the German forces which were spared from Metz to finish up the campaign of the Loire, would have been on the termination of that campaign.

DR. MAGUIRE—I did not exactly catch the spot at which the gallant Captain would place the English troops.

CAPTAIN GRIERSON—Say, in the most advantageous position on the coast.

LT.-GEN. GOODENOUGH, C.B.—The exact point was immaterial, I take it.

CAPTAIN GRIERSON—I merely ask what would have been the effect.

DR. MAGUIRE—You have a German force in the north and you have a French force at Amiens about 50,000 strong, and a French force at Orleans of 250,000

strong, and then you suggest an English force of about 75,000 to 100,000 strong. This would be about December.

Captain Grierson—We know that the Germans were in inferior force to the French, and that the French in the north certainly gave the Germans a very hard job. We know that towards Le Mans the Germans had also a very hard job. We know that the Germans were far from their base, that the investment of Paris was sustained by a number of German troops much inferior to that of the French forces within the capital. I ask what the effect of a well-organised British force of from 75,000 to 100,000 men, landed at the most favourable point of the coast, would have been against the Germans.

Dr. Maguire—I am very glad, indeed, that Captain Grierson is one of those Englishmen who do not believe that the traditions of England would teach us to efface ourselves. I have not the slightest doubt that an English force, such as the gallant Captain refers to, might at any moment, either in the history of the past, or during the history of the future, in our generation or in any future generation, produce a most powerful influence on any European campaign; and if I might be allowed to say something further—I speak with all due deference to the gallant officer in the chair—I utterly despise the notion that England is to grow in strength or otherwise by effacing herself from continental politics. She did not do so in the past, from the days of William III. till the time when the great Emperor of the French died at St. Helena under English custody. In war after war for more than 150 years British Corps appeared on the Continent, and the British fleet being mistress of the sea, our Generals were able to turn those Corps to very good account, indeed. I believe if the gallant Captain had put the question to a German speaker he would have received the answer that I propose to give him. That such a force thus landed, and England having command of the sea, would have been a most tremendous obstacle in the way of the successful prosecution of the investment of Paris. Just on the spur of the moment I would, if I may, suggest where they might have been put. My sympathies are not anti-German, but as an English officer Captain Grierson would be ready to combat anybody anywhere, and I would be delighted to cheer him on. I understood that he was referring only to strategy and not to any international question.

Captain Grierson—Quite so. The question is purely strategical and not at all international.

Dr. Maguire—Assuming, therefore, that there was some cause of annoyance at this particular date, and that it was a good time to cut in, if you saw any reason, when the Germans had all these trouble about Paris and were hampered from the Loire and from Amiens, supposing they had put the force at Havre at the time (I drop Le Mans for a second) when Faidherbe was coming down about the 9th or 12th of January towards Amiens, and when the Germans found it very hard to hold Rouen and Amiens simultaneously against Roy and Faidherbe, 75,000 English would have compelled the Germans to evacuate all that part of France on the spot, or half 75,000 English. That admits of no discussion at all, I take it.

But I will take another point. Supposing that they came in even *here* at the mouth of the Loire, I do not know exactly the navigation of that river—few of us do know it as well as the Seine—but supposing they went up to Angers, and supposing when the German 75,000 men were moving past the Loir and were fronted by 118,000, that they came up to St. Amand and put themselves where General Curten was, where would the German advance to Le Mans have been? Rapidly the Germans would have had to countermarch to Orleans, and as rapidly

the army at Le Mans would have gone up by Chartres to Paris. I take it that is almost an absolute certainty. If General Curten could move from Château Renault to St. Amand (and Napoleon says that where one man can move a division can move), if a division of Frenchmen could move there I should say that a Corps of British men could just as well move there. And, therefore, when the Germans were going from Le Mans they would have been assailed from the lower Loire on their left flank. To follow the gallant Captain's idea out would take some time; but I will go a little further. I do not see any reason why we should not be proud of our people and of our country; the Russians and the French are so proud of themselves that they go on kissing in the streets and devouring each others faces in patriotic emulation. Supposing when the Russians got down towards Constantinople in 1878 (to follow on the question of strategy) and were only about 60,000 men fit to stand to arms, the remnant of the host that had crossed the Danube and began to fight at northern portions of the Balkans, supposing that an English army 40,000 strong had joined Suleiman Pasha about Enos Bay, where would the Russian Army have been? When the English, in 1808, determined to use their command of the sea and put a force in the Peninsula, where were the Marshals of France, from Junot to Marmont? In 1807 had the English put a force at the mouth of the Elbe when Napoleon was going on towards the Niemen, where would Napoleon have been? Whenever the English make up their minds to act according to the traditions of their ancestors and insist on holding their place among the nations of the earth, I pity the Corps that will be in the position that the German Corps were in between the 6th and the 10th of January, 1871.

Lt.-Gen. Goodenough, c.b.—I should like to make a remark or two. It would almost seem as if Dr. Maguire and Captain Grierson had come down in league together, they have played so admirably into each other's hands. I do not suspect that, I believe it is all *bonâ fide*; but I do not know which to admire most, the good point that Captain Grierson has made, or the admirable way in which Dr. Maguire has taken it up. And I think that without encouraging ourselves in any aggressive tendencies, or with any bloodthirsty views, there is no doubt that the time might come when the action of British troops in the way indicated would be rendered imperative for the interest of the country. It has been very much the fashion lately, no doubt, to regard the fact of the enormous size to which the continental armies have grown as being a reason why we should not be able to show our noses anywhere near. But it has been shown to us very clearly that when Dr. Maguire talks of a Prussian force of 58,000 infantry confronting and driving back Chanzy, it is obvious that if they had been suddenly confronted by a force of 75,000 English from some other direction it would have made a great difference in the operation. I think we are very much indebted to both these gentlemen in the most particular manner for the very good illustration that they have given of the necessity of keeping our powder dry.

The Chairman—It only remains for me to thank Dr. Maguire, in the name of all here, very much for his most interesting lecture. I hope we shall very soon see him here again.

APPENDIX.

Fights for Localities.

Some people thought that the *fights for localities*, such as villages, farm-houses, &c., would be over with the introduction of breech-loaders; they were mistaken. These fights were more numerous than ever, because skirmishing tactics entail the necessity of taking advantage of every accident of ground, great and small. In order to get full value out of the breech-loader, each army was led to attach great importance to the occupation of the borders of woods and villages, which was doubtless right.

But both parties were unwilling to *leave cover*, whether to make an attack or to clear out of a building and retire; hence, on the one hand, musketry fights lasted longer than hitherto at some points; but, on the other hand, one party might leave a building more hastily, so as not to have his retreat cut off by the enemy's fire.

As soon as the outskirts of a village are lost the breech-loader comes into murderous play inside.

The French soldiers were equal to the Germans in village fighting, but the latter were better handled by their officers.

But the excellent peace training of the Germans enabled them to act efficiently according to the circumstances of the moment.—*Boguslawski.*

Disorderly Retreat from the Loir.

Le Mans était devenu en effet une attraction à laquelle un grand nombre d'hommes ne put résister. C'était pour eux le repos, le bien-être, et tout au moins un répit pendant lequel ils n'entendraient plus le canon, qui tonnait constamment tout le jour et une grande partie de la nuit depuis le 28 novembre. Un grand nombre de mobiles et de soldats de ligne se répandirent sur tous les chemins, et bien que la plupart, mal chausés, eussent les pieds endoloris par la neige et par la marche, ils doublèrent les étapes pour arriver plus vite. Il fallait envoyer en avant, pour arrêter ces fuyards sur les routes principales, les régiments de gendarmerie, mais ils ne purent surveiller tous les petits chemins qui sillonnent le pays, et le Mans fut bientôt encombré par cette foule débandée, qui, privée forcément de ses distributions, échappant à toute discipline présentait l'aspect le plus misérable et le spectacle le plus honteux pour une armée. Il est consolant toutefois de pouvoir dire que si de pareils exemples ont été donnés trop fréquemment dans cette partie de la retraite, les gens de cœur qui restaient dans le rang, et c'était le plus grand nombre, cachaient à l'ennemi, par l'ordre dans lequel ils marchaient et leur vigueur à le repousser, ces défaillances, qui ne s'expliquent que par la jeunesse et l'inexpérience du métier militaire, de ceux qui s'y laissèrent aller.—*Chanzy.*

An Incident.

Then Captain Mauritz, of the 11th Infantry, chose a small body of picked men, determined that the Prince's commands should not remain unfulfilled. Quietly they stole through the ravine, quietly gained the crest where stood the many-barrelled pieces belching forth volleys of bullets. The hill was so steep that the muzzles of the mitrailleuses could not be pointed low enough to meet them until the band of brave men had reached the summit. One moment's breath, and then with a wild hurrah they sprang forward, and carried everything before them. The road was cleared, the men on the other bank rose to their feet—all except the

thirteen, who never rose more—and the heights commanding the Huisne were in the hands of the Prussians, though not completely until the next day. While Captain Mauritz and his chosen comrades stood beside the pieces they had taken a Prussian battery opened upon them, not knowing of the gallant deed they had accomplished; and either here, or a little later from the French, he received a wound, "light" in the vocabulary of soldiers, but heavy enough to prevent him from advancing further that day. He was reposing quietly in a little hamlet on the heights, when it was occupied by the French, who held it throughout the night. They would have carried him off as a prisoner, but a woman who had seen his gentleness to her wounded countrymen caused him to lie on her bed, and represented to the French that his wound was dangerous, so that they also pitied him and left him there. Night came, and the faithful few whom he had led so well, consulting how they might rescue him, moved silently out in the darkness and crept into the village where the French were taking their rest after the battle. The Prussian *kinder*, who knew where their captain lay, stole quietly into the house with a stretcher, and saluting him with "Here, captain, now is your time," they set him on the canvass and slipped out as they had come, unperceived.

Alvensleben's Action.

Across the Huisne the Prince's three divisions had in front of them, at one time or another, almost the whole of the French army, and all the while the whole passages of the river were in their hands. Cautious and timid commanders would have hesitated, perhaps retired, before a danger so imminent. But neither Prince Frederick Charles nor Alvensleben of Mars-la-Tour were timid commanders. "The whole country is full of woods, right down to the Huisne," they said "let us attack, and the French will never know how weak we are." The wisdom of secrecy in war was, in fact, never more manifest than in the operations this day; for had the French known the real number of the force opposed to them, they would certainly never have permitted their position to be taken. Their ignorance, or at least the possibility of deceiving them by an audacious movement, was one of the elements in the calculations of the German commander, who might have been attacked with a fair chance of success if the French had been well served by spies. The Prince ordered the 18th Division to carry the hills above Champigné, and sent the 5th and 6th Divisions, forming the 3rd Corps, against the Huisne, The 3rd Corps received the order to advance on the 11th, in the middle of the day. Their numbers could not have exceeded 18,000 men, for they left Orleans only 22,000 strong, and had been fighting ever since. They advanced, however, against the great natural rampart held by 50,000 men, over ground covered with woods and intersected by lanes separated from them by ditches and banks. The woods were filled by French riflemen, and beyond the river in front were their artillery and mitrailleuses. Alvensleben's brigades advanced, the 10th Brigade going northward to try and gain the road to Le Mans by Savigné; the 11th marched upon Château-les-Noyers, about 500 yards from the Huisne; the 12th was sent to attack Yvré, and the 9th was held in reserve. The 11th, in executing its orders, soon found itself enveloped in a furious tempest of fire from the French batteries on the hill opposite Château-les-Arches. After the battle not a tree could be found that was not marked with balls.—*Hozier*.

La Tuilerie.

The night of the 11th was passed in some anxiety by General Alvensleben. When complimented in the evening on the behaviour of his men, he remarked: "Yes, but I am not quite satisfied with what the 3rd Corps has done." Not satisfied, when he had shown so bold a front that the French must have believed they had a whole army before them! The Germans, indeed, disappointed as they were with their tactical achievements, did not know what advantages they had

really gained this day. While Alvensleben was vexing himself in his quarters, General Chanzy was writing a despatch announcing his own defeat. In the course of the night he telegraphed from Le Mans to Bordeaux, the following message to M. Gambetta: "Our positions were good last night excepting at La Tuilerie, where the mobiles of Brittany disbanded themselves, thereby causing the abandonment of the positions we occupied on the right bank of the Huisne. Vice-Admiral Jauréguiberry and the other Generals think a retreat is necessary under these circumstances. I resign myself to it unwillingly." La Tuilerie was an important link of the positions stretching from Changé to Savigné l'Evêque, and upon its maintenance Chanzy calculated as the key to his whole plan of resistance. The Brittany mobiles who held it had been warmly praised for their behaviour under fire hitherto; but an attack of artillery opened upon them on the evening of the 11th completely disconcerted both officers and men. The officers were too astounded to give orders, and the men, thus left to themselves, in an evil moment determined upon instant flight. Horses were precipitately harnessed to the guns, and the column commenced a retreat which never paused till they reached Le Mans.—*Hozier*.

Extract from General Chanzy's Letter to M. Gambetta, January 13th, 1871.

Occupant en effet des positions magnifiques pour la défense que j'avais choisies et préparées à l'avance, je ne mettais pas en doute de pouvoir y résister et y tenir au moins pendant quatre ou cinq jours, assez pour que, lassé par nôtre persistance le prince Frédéric-Charles dût se mettre en retraite.

Appelant alors à moi les 19ième et 25me corps qui auraient achevé pendant ce temps leur organisation, installant sur mes positions les mobilisés de Bretagne que vous m' aviez accordés et que je croyais alors une force effective et serieuse, mon intention était de marcher sans un jour de retard sur cet ennemi affaibli et fatigué, et il me semblait pouvoir, sans présomption, espérer le succès.

Il ne devait pas en être ainsi: les incidents les plus inouïs et les plus inattendus allaient déjouer toutes mes prévisions.

L'ennemi s'avançant avec des forces tres considérables, je rappelai à moi les colonnes mobiles, qui opérèrent leur mouvement rétrograde dans le meilleur ordre, sans se laisser entamer, et apres avoir défendu successivement, et pied à pied toutes les positions en avant; j'établis toutes mes troupes sur les lignes de défense que je leur avais choisies. Les attaques de l'ennemi etaient opiniâtres et incessantes.

Néanmoins, le 10 janvier au soir, toutes mes lignes étaient intactes, et, malgrès les doléances de quelques chefs, venaient me déclarer que leurs troupes en avaient assez et refusaient de se battre, et me supplier d'ordonner la retraite, ma confiance était entière.

Le 11 au matin, je parcourus à cheval toute la ligne de bataille, relevant le moral des troupes, leur promettant des récompenses que vous m'avez autorisé à leur décerner, et faisant un appel, écouté et compris par elles, à leur patriotisme et à leur courage.

La bataille s'engagea à ma droite sur les hauteurs en avant de Pontlieue. L'amiral maintenait toutes ses positions et pénétrait même sur celles de l'ennemi. Sa gauche seule avait faibli un instant; mais j'avais arrêté ce mouvement en faisant placer sur les hauteurs d'Yvré deux batteries, qui prirent ennemi d'écharpe et le firent reculer.

Au centre, le Général de Colomb luttait péniblement sur le plateau d'Auvours, que l'ennemi avait un instant ménacé d'occuper tout entier. Mais un effort vigoureux du Général Goujard l'en chassait, et nous laissait maîtres des positions.

Au gauche et plus en avant, le Général Jaurés combattait sans perdre un pouce de terrain, et avec avantage.

Aussi, quand vers six heures de soir, je quittai le champ de bataille pour rentrer à mon quartier général, j'étais on ne peut plus satisfait de la journée, qu'on pouvait à bon droit considérer comme une victoire, et tout prêt à recommencer le lendemain.

Tant d'efforts allaient être perdus. J'appris d'abord que le Général de Lalande, placé par l'Amiral au plateau de la Tuilerie, au centre de sa ligne, avec les mobilisés de Bretagne et l'artillerie, avait évacué spontanément, à la nuit, cette magnifique position sans la défendre, et devant des forces très inférieures. Les mobilisés d'Ille-et-Vilaine avaient fui au premier obus ; l'ennemi s'était installé à la Tuilerie sans coup férir.

Je donnai à l'amiral l'ordre de réattaquer immédiatement et de reprendre à tout prix la position la nuit même. A deux heures du matin, l'amiral informait qu'après avoir été réunies et amenées à grand peine, les troupes chargées de cette attaque s'étaient enfuies et debandées au premier coup de fusil, et que la position n'avait pu être reprise ; que la division de Jouffroy, placée à sa gauche s'etait debandée pendant la nuit et avait lâché ses positions, aussitôt occupées par les Prussiens, et que sur tous les points, à l'exception de la division Roquebrune, les troupes, prises d'une panique et d'une défaillance inexplicables, se débandaient en grand nombre, qu'on ne pouvait plus compter sur elles, et qu'il fallait songer à la retraite.

Néanmoins, elle ne fut pas un repos pour les troupes, qui, campées dans la boue et dans la niege sans pouvoir allumer les feux de bivouac, eurent beaucoup à souffrir du froid et de l'humidité. Il y avait évidemment chez elles un lassitude qui ne permettait pas d'attendre de leur part une grande vigueur, si la lutte devait recommencer avec le jour ; les chefs de corps ne dissimulaient point leurs appréhensions à ce sujet. Le général en chef recevait de son côté, à chaque instant, des renseignements peu rassurants sur le moral des hommes, et l'amiral Jauréguiberry lui-même, sur la ténacité duquel il était habitué à compter, venait à cinq heures du matin, lui déclarer qu'il ne croyait plus à une résistance sérieuse.

General Vial on the Principal Lessons of the War.

The principal lesson of the war is that the military institutions of the country, the army, the materials of war, fortifications and fleets should be the very first concern of the Government, the Legislature, and all classes of society.

The principal military conditions which enter into the case of complete preparation for war are :—

1st.—A large regular army—at least as large as the resources of the country will admit of.

2nd.—A reserve sufficient to protect lines of communication, to guard fortresses, to complete the numbers of the battalions going to the front, and to fill up the gaps in the ranks which result from active service.

3rd.—For continental nations conscription of the fullest character is indispensable ; indeed, is the only means whereby sufficiently numerous armies to cope with modern conditions can be maintained. Every healthy man, without any distinction of rank or social position, must be compelled to bear his share of the national burdens. That our own middle and upper classes should dream of shirking their military duties in connection with the Volunteers is a disgrace and may be a disaster.

4th.—The troops must be of excellent quality as well as of large quantity. Discipline should be maintained with the utmost severity and inculcated from youth up ; the officers should be manifestly of superior tone, of good character, of physical and moral excellence. In time of war punishment should be certain, prompt, and public, in all cases of insubordination. The shorter the service the greater the necessity for absolute discipline.

5th.—As to *instruction* of soldiers, its object is to prepare men to fight. It ought, therefore, to be adapted to the circumstances of modern warfare. Each individual soldier, every unit of the military organisation, ought to be taught to march, to bivouac, and to fight. Military education should be practical, and should, as far as possible, give a clear idea of what would take place in battle. It should be national moreover—it should not be a mere imitation of what suits other lands. Every people has its own aptitudes and defects; the former should be developed, the latter cured. Above all things the *morale* of the men should be brought up to the level of their responsibilities.

6th.—The administration of military affairs should be entrusted to persons thoroughly qualified for providing for military exigencies, and to them only, all other political exigencies being resolutely kept in the background.

7th.—Not only should the military establishments of the nation be complete in every respect, they should also be available at once. The distribution of materials should be easy and rapid; the weapons should be of the highest quality and of the newest and best pattern. The fortresses should be in the most suitable positions, should boast of the newest devices of engineering, should be constantly brought into line with the progress of the military science. So called economy is often more foolish than dissolute waste.

Capture of Le Mans.—Result of the Battle.

It was not until the following day, January 13, that Prince Frederick Charles thought it prudent to remove his head-quarters to the préfecture of the captured town. The Grand-Duke of Mecklenburg was sent towards Alençon, which in a few days experienced the fate of Le Mans. The 18th Division pushed on and occupied the entrenched camp at Coulie. The 10th Corps was sent on towards Laval, but found the bridges broken up, and was not sufficiently strong to overcome such opposition as Chanzy's troops were still able to offer. At Le Mans and Coulie an enormous quantity of arms, ammunition, food, and what was even of more consequence, railway materials and rolling stock fell into the hands of the Germans. On the 16th Prince Frederick Charles reported that in the engagements from the 6th of January to that date he and the Grand-Duke of Mecklenburg had taken from the enemy more than 22,000 unwounded prisoners, two colours, nineteen guns, and more than 1000 loaded ammunition conveyances, besides a large quantity of arms and other war material. The army of the Loire was, in fact, broken up, and with it Paris had lost its best hope of relief. The losses of the Germans in the fighting about Le Mans amounted, in killed, wounded, and prisoners, to 177 officers and 3203 men.—*Hozier*.

An Engagement.—Brives, January 9th.

On the 9th, at 2 p.m., the Division continued its march toward Brives, along the left bank of the brook. But, to the inconvenience which snow and fog caused this day to all the troops of the army were added in the case of the Xth Corps, the extraordinary difficulties which were entailed at this time of the year in marching through hilly country, full of steep slopes, ravines, and hollow roads. Cavalry and artillery had to dismount and lead their horses; every falling horse detained the column. The General Commanding had to ride on a limber; the Head-Quarter Staff marched on foot. The Corps Artillery could not be employed at all, and could scarcely be brought along the frozen defiles. It was sent back at noon to Lavenay, by way of Le Pont-de-Braye, under escort, with the view of advancing on the following day by the better road through Vancé.

General v. Woyna, in accordance with the orders which he had received, had

directed his march on Brives. When he reached La Chênehuère Château, after driving off some hostile detachments, the engagement at Chahaignes had already come to an end. As it appeared doubtful whether the 20th Division had continued its march at all, and whether his detachment unaided could successfully cross the low ground which was strongly occupied by the French, General v. Woyna retired to the Tusson brook.

When the advanced guard of the 20th Division reached Brives at 3.30 p.m., it was received with a brisk fire from the heights north of the village. Off the roads even infantry could only move with great difficulty, and at a slow pace, so that any turning movement became impossible, and nothing remained but to make a frontal attack on and alongside the road.

This was carried out with great resolution by detachments of the 56th and 79th Regiments, and the enemy was forced to retreat.

Two Guns.

Paris' Division of the 17th French Corps had taken up its position occupying Château Ardenay on the right, while four guns and two mitrailleuses had unlimbered on the left behind La Butte.

On the German side, only two guns of the 6th Light Battery could be brought against them, and these found a place on the road. After being in action for half-an-hour they compelled the mitrailleuses to drive away, and afterwards continued the artillery struggle with great steadiness until the end of the engagement. The 64th Regiment deployed in first line. With the assistance of two companies of the 24th Regiment Château Ardenay was carried by storm at 4 o'clock. To the north of the high road the 64th pressed forward through the strips of woods which project towards La Butte, and beat off a hostile forward movement by a resolute counter-attack. Ultimately they were successful in crossing the outlying meadows on the extreme right flank, and establishing themselves in the copses on the further side.

DEFENCE OF ESTUARIES, HARBOURS, ETC., AGAINST TORPEDO-BOAT ATTACK.[1]

BY

CAPTAIN J. C. WRAY, R.A.

The following points, in connection with defence against Torpedo Boat attack, have occurred to me during the short time that I have served in the Garrison Artillery, and I do not, therefore, make any pretence, that they are the result of much experience in the matter; but my attention was drawn to the fact by the state of public affairs when I first joined in the latter part of the summer, and the fact that the estuary which my company defends is within Torpedo-boat attack of a continental port.

The chief points to determine on are:—

First the means to discover the attack,

Secondly the best means of defeating it; and

Lastly the relative parts to be played by the Artillery and Royal Navy.

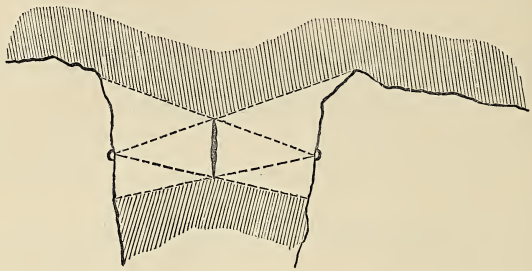
Means of Detection.

Now as regards the means:—until actually on the spot, face to face with the facts, and the actual armament, etc., at hand to meet the attack, one hardly realises what the tension would be in being constantly on the "*qui vive*" night after night for prolonged hostilities. No army in the field would long endure the strain without an efficient system of outposts furnishing complete rest—and the outposts of coast batteries must be the electric light.

If two fixed lights were placed—one on each side of the entrance as far seaward as possible, and so arranged that each throws its beam towards the other—a *fixed*, broad belt of light would be provided, thoroughly searching out the shore on each side, through which nothing could pass without discovery, and owing to the arrangement of the lights, there would be no chance of crawling up and getting through where the beam was narrow close in shore. The narrowest portion of

[1] The Committee publish this paper in order to bring the question of how best to meet Torpedo-boat Attacks to general notice, and invite further consideration.—*A.J.A.*

the belt would be at the intersection of the two beams in the centre of the passage.



The lights themselves would be protected by being placed in cells, with communication by telephone to the various defences. By these means, the guard mounted at these cells with the belt of light under constant observation, would be able to give early alarm. Two additional lights with movable beam would also be provided; these coming into use the moment the enemy was discovered, and following his movements. The guard having given notice of the first boat, would then quietly resume the watch on the fixed belt of light, as the attack would probably consist of three or four boats coming in at distances of from one to two miles apart—Nos. 2 and 3 trusting to get through unobserved in the confusion caused by the passage of No. 1, and hoping that the whole attention of the defence would be engrossed by it. Also the first two lights being fixed, there would be no danger of all the lights getting on to and following the first boat—such an event would simply mean that any boats behind the first would slip by unobserved.

Defeat of Attack.

Due notice of attack having been provided for, the next point to consider is how it is best defeated.

Quick firers are commonly supposed to meet the case, but personally I must confess to disappointment as to results. I do not quite know what I had expected to see, but I had rather pictured to myself the water all round the boat alive with the splash of shot; this was by no means borne out by experience. The Maxim would, no doubt, hit the boat, but the rifle calibre gun would scarcely stop it.

It would be interesting to know the comparative results of experiments with Q.F. guns and the heaviest guns firing case shot or time shrapnel at targets moving at high rates of speed.

If heavy guns were relied on, a certain number would be loaded every evening with case, and others with time shrapnel, to cover distances from the extreme range of case (800 yards in the case of the 12·5 inch M.L.), up to longer distances, the length of the fuze being fixed on locally and used in the same manner as shrapnel with fixed length of

fuze is at cavalry in the Horse and Field Artillery—for in reality the torpedo-boat is the "hostile cavalry" of the coast fort.

The drill-book recommends the fuzing of shell after the boats are discovered. This might suit certain localities, but the loading of heavy guns takes some time, and it would certainly not suit the only locality of which I have any experience. It must be remembered that the *least* speed at which the enemy would come in would be *750 yards a minute*, and to meet such speeds with success everything would have to be cut and dried: guns fully loaded, the approximate elevation and training given, and the deflection ready on the tangent scale.

In some places it would be possible to provide booms; these would very materially increase the power of the defence. In estuaries leading to large commercial ports, an opening would be left for free exit and entrance of vessels—the opening, if possible, being within effective case range of the defence, and the guns being loaded and layed on it; the length of fuze of shrapnel having been determined by actual shooting.

The material for booms should be a special article of store in each locality, and might consist of heavy baulks of timber with short and strong spikes protruding some three inches, arranged in a similar way as the spears in a *chevaux-de-frise*, so that any attempt to jump the boom would mean that the bottom of the boat would be ripped open.

The R.A. and R.N.

The last point for consideration is the relative part in defence to be played by the artillery and any naval force lying up the estuary.

The navy are naturally responsible for, and would rightly insist on a free hand in defending their own ships, and I understand the favourite defence is by a kind of "out-posts" of guard-boats and other torpedo-boats should any be available. The exact part to be played by each service should be definitely settled for each locality, and not left to be decided by the respective C.O.'s—which latter course would probably give rise to considerable friction.

From our point of view it is easy to imagine the feelings of the unfortunate Fire Commander pacing his cell like a caged beast with what is known in aquatic sports as a "duck hunt" on an elaborate scale being performed below by the hostile boat and the out-post boats of the R.N.—the guns of the defence being masked by their own side!

In addition to this draw back it is just possible that the constant passage of boats might at least lead to an enemy slipping in; being mistaken for a friend—for the enemy would naturally use every effort to disguise themselves. And, lastly, any naval force would probably be coaling against time, in order to put to sea again at the earliest opportunity, and every available man have his hands full without an addition of manning guard boats.

It would appear that great advantage would be mutually derived by the officers of the Coast Artillery and R.N. witnessing each others practice, and getting, thereby, some idea of what each can do. Our officers would gain the additional experience of the various types of men-of-war and their general arrangements as regards their batteries, &c., of which subjects, I fancy, their ideas are at present somewhat

vague—especially those officers who have spent perhaps all their previous service at Aldershot and kindred places, and whose ideas of ships are limited to some particularly unpleasant passage in a trooper.

Any port with a narrow entrance (Fig. 1) would be best left to artillery, the defence being supplemented by booms when possible. Anything approaching to an open roadstead (Fig. 2) or bay would seem to be easiest dealt with by boats from the ships placed as outposts.

Fig. 1.

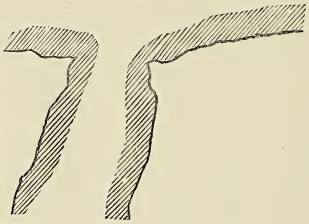


Fig. 2.

It would have been somewhat easier to illustrate practically by referring to the particular locality at present in my mind, but this would have involved exact details of armament, &c., and the present condition of defence, which of course could not be done.

SOME FURTHER REMARKS ON

HORSE ARTILLERY GUNS AT WATERLOO,

IN ANSWER TO MAJOR MURDOCH, R.A.

CONTRIBUTED BY

COLONEL F. A. WHINYATES, LATE R.H.A.

In discussing in the December Number of the R.A.I. "Proceedings" the point as to the number of light 6-pr. guns that were used at Waterloo, Major Murdoch considers the authority upon which I based the statement that there were twenty guns of that calibre in the field on the 18th June, 1815, unreliable. It is proposed to answer his objections seriatim.

Major Murdoch does not seem to have taken much notice of the paragraph in Sir John May's letter which accompanied the return, and to which attention was drawn by note No. 1 in my former paper, and consequently he is hardly in a position to judge whether the document is trustworthy or otherwise. Let us again look at the portion of the letter referred to :—"I enclose a return of the troops and brigades employed in the battle of Waterloo. Also a memo. from which with the return, I conceive you may make out something fit to meet the public eye, and I beg you will do so." If the return in question did not give the particulars concerning the artillery at the time of the battles of Quatre Bras and Waterloo, as Major Murdoch contends, but had reference to some previous period, one is at a loss to understand what could have been the object of sending it to enable an account of the artillery and its doing on those occasions to be drawn up for publication. That the form was carefully examined by Sir John May is evident, for in the body of it, he has made a correction in his own handwriting. Major Murdoch remarks that the return is not in Sir John's letter book. It was not likely to be put there, being a document sent privately to a brother officer for a special purpose in no way official.

While fully admitting that numerous changes took place in the equipment of the artillery in Belgium in 1815, it seems extremely unlikely that a staff officer of the ability and experience of Sir John May, who had served as Brigade-Major and Assistant-Adjutant-General to the Royal Artillery in the Peninsula from 1809 to 1814, should not have been acquainted with the changes of armament, etc., made in the troops and brigades of the artillery force under his charge, and that

ten months after the battles of the 16th and 18th of June, when there was ample time and leisure to make any necessary inquiries, he should have failed to compile a trustworthy detail of the arms employed.

The object in view was one in view of which it was especially desirable to be accurate; and in spite of what Major Murdoch says it is difficult to believe that Sir John's statement was otherwise.

With regard to Major Bean's "D" troop, R.H.A., Major Murdoch writes as follows:—"The return is inaccurate *on the 18th of June*, for it shows Bean's troop with 6-prs." Now the D.-A.-G., R.A., on the 15th of May and 2nd of June, wrote to Sir George A. Wood, "Ross's and Bean's troops will make up the eight demanded by the Duke; but have poor horses (Irish): Bean takes 6-prs., but these can be changed at Ostend for 9-prs." "Bean's troop arrived at Ostend on the 10th of June, and accordingly, at once exchanged its 6-prs. for 9-prs. (*see* 'History of the Royal Artillery,' Vol. II., p. 418, and 'Mercer's *Journal*,' Vol. I., p. 158)."

Now with regard to the above, the question is, did Bean exchange his 6-prs. for 9-prs. at Ostend? It is maintained there is no evidence that he did so. At p. 418, of his 2nd Volume R.A. History, Colonel Duncan says, "that Sir Hew Ross's troop arrived at Ghent on the 9th of June, and Major Bean's at Ostend on the 10th of June," but no statement on that page is to be found, *that he at once exchanged his 6-prs. for 9-prs.*,[1] as quoted from it by Major Murdoch. There is, however, on this page the copy of a return giving the armament of seven troops of horse artillery, which was sent to the Deputy-Adjutant-General, Royal Artillery, on the 30th of May, to which is appended the following note: N.B.—"Major Bean's troop when it arrived was armed like Sir Hew Ross's." How a document written on the 30th of May, could certify to what happened on the following 10th of June, requires explanation. Probably the note is wrongly copied and should state what was intended to be done, and not what had taken place. Then we come to Captain Mercer's statement, p. 158, Vol. I., which runs thus: "At Waterloo, on the 18th of June, there were present eight troops of British and two of Hanoverian Horse Artillery. The British, '*as far as I can recollect*,'"[1] here he enumerates the various troops and the armament of some of them, and then goes on, "each of the others (including Bean) had five 9-prs. and one 5½-inch howitzer."

On the other hand, Siborne the historian in his "History of the Waterloo Campaign," p. 518, Vol. II., Appendix, where he enumerates the artillery, gives "Capt. G. Bean's (Major) light 6-prs." Colonel J. E. Michell in his "Records of the Royal Horse Artillery," p. 7, gives "D," Major Bean's—6-prs.

After weighing the evidence on both sides for and against, is it unreasonable to conclude that, although it was the intention to change the equipment of "D" troop from 6-prs. to 9-prs., there is nothing to prove such was done, but strong evidence that they had 6-prs. on the 18th of June.

We come now to Lieut.-Col. Webber Smith's "F" troop. Major Murdoch seems to have read hastily Sir John May's memo. concerning

[1] The italics are mine.—*F.A.W.*

the troops and brigades engaged on the 18th of June. It runs thus: "and every *brigade*[1] except Major Brome's that was with the 4th Division at Hal, and *Major*[1] Smith's that did not arrive in time." Not "Webber Smith's 6-pr." troop, as Major Murdoch misquotes it. Now we know on the authority of Lieut.-Col. Sir A. Frazer, (*see* "Mercer's Journal," p. 159), "that at the beginning of June, including the horse artillery, there were twenty brigades of British Artillery, or 120 pieces, ready to take the field. More arrived, I believe, after this." Major Francis Smith, R.A., commanded one of these, and though marching to join the army did not arrive in time for the battle. However, let the commanding officer of "F" troop speak for himself as to his presence at Waterloo.

"Lieut.-Colonel Webber Smith's troop. Light 6-prs.[2]

Major-General J. Webber Smith, C.B., R.A.,
Captain and Brevet-Lieut.-Colonel, R.H.A.,
Dublin, 29th August, 1835.

I first came into action in the field near Hougoumont with my right close to the road and a little in front of the sunken road. Bull was then much to my left, being on the ridge above the orchard. When I had got my harness, etc., etc., in order in the hollow way,[3] I got into position a little to the left of Bull. I think Ramsay was between us, and no charge or attack of cavalry had taken place before I was in action *there*.

Believe me, etc.,
J. Webber Smith."

In a note in his paper, Major Murdoch says, "it (Webber Smith's troop) had been placed in position at Nivelles (Frazer, p. 557)." This is incorrect; what Lieut.-Colonel Sir A. Frazer wrote was, "I placed Webber Smith's troop to fire down the pavé leading from Nivelles towards Waterloo." This position was on the field of battle; besides as the French army on the 18th of Juue was five and a half miles in front of, and between the British army and the town of Nivelles, it was impossible for any British troops to have been posted there.

Of the 2nd Rocket troop little need be said. In May, 1815, it ceased to be entirely a Rocket troop, and received light 6-pr. guns, at the same time in accordance with a plan (a copy of which is before me), which was submitted by Capt. E. C. Whinyates to, and approved by, the Duke of Wellington, it took also into the field 800 rockets.

Major Murdoch concludes his remarks by saying "thus, it will now

[1] The italics are mine.—*F.A.W.*

[2] *See* "Waterloo Letters," edited by Major-General H. T. Siborne, p. 191.

[3] This brought them (the French) under the fire of Lieut.-Colonel Smith's Horse Battery, which had been pushed forward into the valley on the west of the Nivelles Road, both to check the advance of the French Infantry and to answer that battery of Piré's which had been directed against Bull's howitzers, and which Smith had succeeded in silencing. The French skirmishers crept up under cover of the brushwood and the tall grain, within short musket shot of the flank of Smith's battery, and opened so destructive a fire against its horses and gunners that it was disabled for present use and obliged to withdraw into a "hollow way" in its rear "in order to refit." "Quatre Bras, Ligny and Waterloo," by Dorsey Gardner, pp. 229–30. *See* also Captain Siborne's "History of Campaign of 1815," pp. 392–3, Vol. I.

have been proved that only ten *light 6-prs.* were engaged at Waterloo." With all due deference it is impossible to agree that such has been done, on the contrary, it would rather seem that beyond a question there were fifteen in action, and very strong evidence that there were twenty. Let us briefly review the evidence regarding Major Bean's troop, on the one hand we have the testimony of the Assist.-Adjutant-General, Royal Artillery, that of the Historian of the Campaign—Capt. Siborne, who was indefatigable in his researches, and who had official assistance, and we have that of Colonel Michell in his "Records of the Royal Horse Artillery." On the other hand we have the return to the Deputy-Adjutant-General, Royal Artillery, of the 30th of May, 1815, with its prophetic foot note stating what happened on or about the 10th of June at Ostend, and we have the recollections of Capt. Mercer. The preponderance of the former over the latter can hardly be disputed, and I have therefore no hesitation in adhering to my former statement that there were twenty light 6-prs. in action at the battle of Waterloo.

THE FRENCH SOUDAN

UP TO DATE.—JANUARY, 1894.

Compiled from the French accounts in "Le Temps" (with permission.)

BY

CAPTAIN S. P. OLIVER, *late* R.A.

(Continued from No. 2, Vol. XXI., p. 54.)

PART II.

The Attitude of Tiéba, the Almamy of Sikasso.

On the other hand, events would evidently have turned out otherwise, if, at the moment when Colonel Humbert vigorously attacked Samory on the line of the Milo, the French ally, the Almamy of Sikasso, had taken the enemy in rear by a column which should have operated in the direction of Guéléba. Indeed, Tiéba did not give the assistance expected from him, and his warriors did not penetrate far enough within the State of Samory. It was even believed that Tiéba was disposed to turn against the French and to make an alliance with Ahmadou and Samory. That which gave some cause for this belief was the erection of fortifications at Sikasso during the course of the year 1892, at the very time when his troops should have been operating against Samory. Besides, it is certain that he had entered into correspondence with them, as will appear presently.

But it is always necessary to treat Africans in their own way, and not to judge of their conduct in comparison with that of Europeans; and subsequently the events which determined the conduct of Tiéba, at the time when Colonel Humbert marched on Kérouané, have come to light.

It appears that Samory possessed, or at least had a great influence over, two large fortified villages, Tiongi and Fourou, which are situated at some hundred kilomètres to the south-west of Sikasso, on the road which leads from the States of Tiéba towards the regions then occupied by the French troops. When the French Resident at Sikasso, Lieutenant Marchand (who had succeeded Captain Quiquandon, who

had exercised a great influence over Tiéba), asked the Almamy to march against Samory, he experienced a certain hesitation if not a refusal. Incontestably Samory had been the enemy of Tiéba, and this last well remembered the long siege of his capital, which cost the loss of many men and horses to his adversary. Without doubt Tiéba did not forget the services which the French had rendered him by sending, in 1890, Bodian, the then new *Fama* of Ségou, to the siege of the fortress of Kinian, which he had been besieging for a long time. But he knew also how the blacks fight in the Soudan, and he was unwilling to march against Samory until after having subdued Tiongi and Fourou, which were in a position to threaten his communications.

Under pressure from the French Resident Tiéba at length was persuaded to send, in August, 1891, a strong column against Tiongi. This village resisted for a long time. Behind earthern walls of slight thickness the black inhabitants held out for several months against their assailants. These, in order to reduce the town, constructed all round it numerous stockaded blockhouses, of larger or smaller sizes, which they call *sagnes*, and which constituted a series of redoubts insuring the complete investment of the place. These *sagnes* were attacked and defended for some weeks. For Africans time is no object, and it is only with artillery that it is possible to reduce speedily the defenders of such fortifications.

The siege of Tiongi, taking place during the winter, was an onerous undertaking for Tiéba, who lost numbers of horses. Cavalry forms the principal element of the Soudanese armies, and a large force of cavalry is a sign of a chief's power. Indeed, horses are dear and difficult to rear in the regions below the twelfth degree of latitude. The campaign against Tiongi, although it ended on the 7th September by the taking of the town, indisposed Tiéba, and especially his following, for further operations. In spite of all the efforts of Lieutenant Marchand, he could not induce the Almamy of Sikasso to march against Samory, and even the relations of the French Resident with Tiéba became strained so far that a rupture was apprehended.

During this period intrigues were rife about the Almamy, to whom the French were depicted in the darkest colours. Some of his councillors tried to excite his distrust of the French by insinuating that they had been the allies of Ahmadou and that they had then dethroned him; that they had treated with Samory and then made war on him; in short, that after the fall of the Sultan of Ségou and of the Almamy of Ouassoulou, it would be he, Tiéba himself, who would in his turn be dispossessed of his States.

Tiéba did not permit himself to be influenced by these councils, and did not break off his alliance with the French; but, with a keen sense of his own interests, declared to Lieutenant Marchand that he would not proceed against Samory until after he had made himself master of Fourou. It was said by some that the French Resident had, perhaps, been over zealous in carrying out the instructions which had been given him. As it happened Tiéba was not obliged to send his troops against Fourou; for, in May, 1892, this town opened its gates to Lieutenant Marchand, who went to Sikasso on his return from the

exploration of the Kaladian and the Upper Cavally. The surrender of Fourou to a French officer is an illustration of how a number of the petty States of the Soudan prefer to place themselves under the protection of France rather than become subjects to the great native chiefs. Meantime Captain Peroz, a Soudanese diplomate, who had treated with Samory, was sent on a mission to Tiéba by Colonel Humbert, and this emissary arrived at Sikasso at the end of the year 1891, and he also failed to obtain material assistance against Samory. Tiéba preferred to remain neutral. This was certainly showing ingratitude to an ally who had aided him to take Kinian, "but it is not necessary to go as far as Africa to seek similar ingratitude among men or monarchs." (Witness the recent attitude of Italy towards France! is what the chronicler evidently intends to point toward).

After the death of Tiéba, the power passed into the hands of his brother Bemba. But Tiéba has left a son, named Phou, who possesses considerable influence in the country, and he and Bemba are consequently rivals. In consequence it does not do for the French to count too surely on a continued alliance with the people of Sikasso; it is considered, however, that interior difficulties will prevent the chiefs of Kénédongou becoming actively hostile towards their French neighbours, and, therefore, all things considered, affairs in this direction are tolerably satisfactory.

Insurrectionary Movements in the North-East Soudan.

So far, what with a desperate struggle on one side with Samory, and with serious difficulties on another with Tiéba, it is evident that, in 1892, the situation throughout the Soudan to the south and south-east was not of the most promising nature. But there was more besides. The populations of the north-east of the French Soudan became aroused, at the instigation of that old enemy to the French, Ahmadou, now taking refuge in Macina, where he was carrying on intrigues against his brother Mounirou. The fama of Sansanding, Mademba, had not been very successful in his new kingdom, and all around him a coalition had been formed. El Hadj Bougouni was chief of the province of Mampala, the friend of Ahmadou, whom he had helped to pass on to Macina after the abandonment of the Kaarta. El Hadj Bougouni had grouped around him some Toucouleur contingents, commanded by Oumarel-Samba-Doulé, and some Barbara contingents from the Monimpé and the Sokolo districts. All these forces had marched against Sansanding, which was soon closely invested. Mademba called on his colleague of Ségou, and Bodian sent all his disposable troops on the left bank of the Niger to assist in the defence of Sansanding.

At the same time some important uprisings took place in the south of the kingdom of Ségou. The Peuhls, as before remarked, have colonies in these regions, and the Peuhls are pastoral tribes. Now a violent cattle plague, originating in the central Soudan, had, in the course of the two previous years, destroyed a very large proportion of the flocks of cattle in the valley of the Niger. Monteil, in his journey, has described the dire effects of this terrible epidemic. The populations naturally who most suffered were the Peuhls, and such was

the misery of those of Ségou that they resolved to abandon the country and regain the regions of Segala and of the Bakhounou, situated on the left bank of the Niger, where formerly they had resided. This emigration, nevertheless, did not fail to partake of an insurrectionary character with regard to the new rulers of Ségou, and almost at the same moment when the French Resident, Captain Briquelot, was informed of these incidents he heard of the assassination of Lieutenant Huillard, killed in an ambuscade which the Sambori Peuhls had placed to entrap him. Captain Briquelot did not lose a moment. Ségou was denuded of troops, for Bodian had sent his contingents to aid in the defence of Sansanding; nevertheless, he found it possible, with a small body of a hundred men, to bring in and bury the body of Lieutenant Huillard, and, moreover, to attack the Peuhl encampment at Boumouti, and put to flight the contingents there assembled. But the numbers were disproportioned; the small troop of Captain Briquelot had five natives killed and 34 wounded, among whom were the only three European officers among them. It was, therefore, necessary to return to Ségou, whilst the Peuhls were overrunning the whole country. The French communications were soon cut off for some little time, and Ségou was blockaded like Sansanding.

Colonel Humbert, who happened at this time to be in the neighbourhood of Siguiri, returning to Kayes, at once sent Major Bonnier to take the direction of affairs in the north-east of the Soudan. Commandant Bonnier, like Captain Briquelot, thought it was most necessary to act with promptitude; he raised at Bammako an auxiliary company of tirailleurs, crossed the Niger on the 13th May and joined his column to the force which Captain Briquelot had brought from Ségou, and which now amounted to 1000 of Bodian's men. On the 28th May he met the Peuhls, to the number of about 1000, cantoned at Nonguella, put them to rout, and pursued them. Catching them up again on the 3rd June at Ouo on the Baguié after a forced march of 65 kilomètres in 24 hours, he killed 100 of their men and made numerous prisoners. The Guéniekalary province, which lies to the south-west of Ségou, was thus disembarrassed of the marauding bands which troubled it.

This movement among the Peuhls, however, had been joined by the late rebellious insurgents of the Baninko, of Minianka, and it was at Koïla, at 70 kilomètres to the east of Ségou, in the centre of the province of Kaminiandougou, that the centre of the revolt was established. Commandant Bonnier having gone back to Ségou after the affairs in Guéniekalary, departed again on the 19th June in order to attack Koïla. The rapidity of his march enabled him to surprise the rebels massed in the town. The attack was delivered, and, although it cost the French some numbers of native casualties, killed and wounded, the rebels were forced to fly, leaving behind them over 100 dead bodies and 500 or 600 prisoners. Tranquility being thus secured in this quarter, Commandant Bonnier was able to lead his column to the relief of Mademba, who was still blockaded in Sansanding, where he arrived on the 20th June. He was just in time, for El Hadj Bougouni, the chief of Mampala, who directed the operations against

Mademba, had established his head-quarters in the village of Doséguéla, situated some 20 kilomètres to the north of Sansanding, and his horsemen had ventured to approach within a few hundred yards of the town itself.

On the 25th June, Commandant Bonnier ordered an advance upon Doséguéla by the contingents of Bodian and Mademba, supported by some Sénégal tirailleurs under European officers, amongst others Lieutenant Marchand (just returned from Sikasso), Lieutenants Szymansky and Poittevin, Sub-Lieutenant Biffaud, of the Navy, and Doctor Grall. On the following day a fight took place under the walls of Doséguéla, the marauding bands of Bougouni and the Toucouleurs of Oumarel Samba were speedily put to flight; Oumarel Samba was slain, and an attack was then made on the fortified village itself, which was held by insurgent Bambarras. A breach having been made by the artillery an assault was delivered and, in spite of a desperate resistance, Doséguéla was at last carried by storm and captured. The chief of this village, Niéné Taraoré, in company with 40 of his most faithful followers, blew themselves up with their magazine, and El Hadj Bougouni, fled away to the north and re-entered his own dominion. The enemy lost over 300 slain; whilst the French on their side lost 16 natives killed and 120 wounded, including two European officers.

Thus in less than two months, under the lead of an active, energetic, and intelligent officer, well backed up by his trusty Lieutenants, the double insurrections which threatened the French possessions of Ségou and Sansanding had been extinguished. This brief summary of an acute phase in the Franco-Soudanese affairs, in which some French Quintus Curtius of the future will discover innumerable acts of heroism and self-devotion, indicates how necessary, in dealing with Africans in such a country, it is to act with rapidity, firmness, and resolution, to strike quickly and hard, without giving the enemy any time to reform and rally after he has once been defeated. The French now fully comprehend how to deal with these Soudanese, as our Indian officers are accustomed to deal with the natives in the numerous petty fights on our Asiatic frontiers.

The Campaign of 1892–93.

From what has before been related, it can readily be imagined that the general outlook of French affairs in the Soudan in 1892 was not altogether too promising. In fact, the situation was somewhat critical. On the south, where Samory was hostile, it was necessary to undertake a campaign under very arduous conditions, for Kérouané, the base of the French operations, is at least 600 kilomètres from Kayes, the capital of the French Soudanese establishment. Towards the east the Tiéba problem was still unsolved, and to the north-east again new complications were to be feared, for it had been ascertained that the people of Macina had taken an active share in the affairs in Ségou, and it was known that Ahmadou, who had become very powerful in Macina, was on the eve of recovering the government of that Toucouleur kingdom by deposing his brother Mounirou.

The Under Secretary of State for the Colonies, M. Jamais, was per-

fectly well acquainted with the serious position of affairs in the French Soudan, and since Colonel Humbert had expressed his desire of retiring from the command, the direction of affairs in the Soudan was confided to Colonel Archinard.

It was decided that, except under certain urgent conditions, the senior commandant in the Soudan should not take personal command of the troops, and that the direction of the active operations should be given to Colonel Combes, who was appointed to the command of the Soudanese native regiment now newly organised. Besides, Captain Quiquandon, lately promoted Commandant, was sent on a mission to Tiéba to counteract the influence of that chief's councillors, who were endeavouring to persuade him to take up arms against the French.

In fact, the Colonial Secretary now gave to the French Soudan a political autonomy, a necessary consequence of the administrative autonomy which had existed since 1887. It was under these new conditions that the campaign of 1892–93 commenced.

The task of Colonel Combes, in charge of the projected operations against Samory, was not only to fight that old adversary of the French and to beat that chief out of the field, it was more especially to isolate completely the territories which he governed both from Sierra Leone, on one side, whence he could procure breech-loading and magazine rifles and ammunition through the British traders, and, on the other side, from the Fouta Djallon, where he was able to exchange his prisoners as slaves in exchange for oxen and provisions.

The map which accompanies this paper makes it fairly easy to follow the line of French operations against Samory, and from inspection the reader will be able to understand how, in order to carry out his programme, it was necessary for Colonel Combes to occupy the valley of the Upper Niger, and to construct there one or more posts up the river from Kouroussa, which hitherto had been the most advanced of the French posts in this direction.

In this high valley of the Niger, for some time past, one of Samory's best and most active Lieutenants had been operating, by name "the old Bilali"—a name given to distinguish him from his sons, also chiefs of the Sofas—who, in concert with Ténesso-Koba, another subordinate chief, under the direct orders of the Almamy guarded the provinces of Kouranko, Sankaran, and Kissi. The old Bilali was the delegate of Samory in his trade for arms and cattle with Sierra Leone and the Fouta Djalon. It was he who, in 1890–91, had laid waste the territories which separate Sierra Leone from the Fouta Djallon, territories recognised by Great Britain as lying within the sphere of French influence. It was this same chief who made this country impassable for those who wished to pass from French Guinea into the valley of the Niger. The missions of Brosselard and Faidherbe in 1890, and of Lamadon in 1891, were thus forced to return to the Atlantic coast without being able to penetrate to the south-west of the French Soudan. The occupation of the High Niger Valley was, therefore, necessary in order to drive out the marauding bands of Bilali, and to permit the establishment of a fresh road of communication between the great river and the Atlantic.

These plans decided on, it remains to see how the operations towards this end were carried out by Colonel Combes.

The expeditionary column, which included a company of the Foreign Legion, commanded by Captain Destenave, was concentrated on the line from Kita to Siguira. It arrived in this town on the 21st December, 1892. There the column was formed which Captain Briquelot was to lead into the valley of the High Niger, and between the 24th and 25th of December the principal portion ascended the Niger in native canoes, which had been assembled for this purpose by M. Ballien, the commandant of the Siguiri district. The column arrived, on the 30th December, at Kankan, having passed many villages, all ruined and abandoned, but without meeting any obstacles beyond several of the enemy's outposts on the crests of the neighbouring hills.

The Colonel at once decided to take the line of the Milo, from Kankan to Kérouané, as the base of his operations. After having reconnoitred the river and ascertained the depth of the channel, he soon perceived that it would readily serve him as a road, inexpensive and safe, for rapid communication in canoes from Bammako to Siguiri and Kérouané. As all the information concerning the movement and numbers of the Almamy's bands was of the most shadowy description, Colonel Combes made up his mind to come to close quarters with them as soon as possible; and, on the 8th January, 1893, two days after leaving Kankan, he reached Ouomi, an important strategical point on the left bank of the Milo. There two groups were formed: one, designated the column of the Milo, was entrusted, under the orders of Commandant de Gasquet, to guard the fords of the river between Kankan and Kérouané, and to keep open the passage for pirogues and lighters carrying supplies to the posts of Kérouané; the other, under the personal orders of Colonel Combes, was intended for active operations in the field.

Operations of Colonel Combes against Samory.

Colonel Combes left Ouomi on the 15th January and arrived, without incident, at Konafadié, a large village situated south-west of Kankan. The principal bands of Sofas, commanded by Samory himself, fled before the approach of the French troops, apparently most unwilling to oppose any resistance to their advance; in fact, the Almamy did not dare to meet the rifles of *Coumbo*, as they called Colonel Combes. Combes' former operations against him, in 1885, had left so deep an impression upon him that he used to say of this officer that he was the devil in person. Those Sofas, who had also previously experienced defeat at his hands during the campaign of 1892, were themselves so terrified that Samory was forced to threaten death to any who should pronounce the name of *Coumbo*.

Some prisoners brought in by the French advanced scouts were able to give accurate information to the Colonel concerning the dispositions and forces of the enemy, whose object appeared to be to escape from the French advance by the south-east of Kérouané, from the Guéléba and from the Nafana, where the Almamy had placed in safety his wives, his corn, and all his goods.

Colonel Combes no longer hesitated to return up the Milo, and by the 24th January he had reached and established himself at the ford of Babila, 40 kilomètres to the north of Kérouané, in a position which commanded the routes both from the east and south.

The following day, 25th January, a flying column was formed which, under the orders of Captain Dargelos, could operate in the Kouranko and the Kissi valleys, to the south-west of Kérouané, in order to meet and drive back to the east any bands which ravaged that country. Orders were at the same time given to Captain Briquelot to act so as to drive back towards the valleys of the Milo and the Dion the bands of Bilali and of Ténesso-Koba, in such a manner as to throw them back if possible on the principal column. These operations succeeded in a marvellous manner, as will be related.

The above arrangements being complete and the regular supply of commissariat stores provided for and ensured, the Colonel no longer encumbered himself with the artillery which had followed so far with great difficulty and only retarded the rate of his marching. The battery, therefore, was left behind to arm the posts of Manantara and Babila, constructed on the Milo, at the passages generally utilised by the bands of Sofas in their coming and going, from east to west and *vice versâ*. A lightly equipped column, but carrying all the supplies necessary for sustaining a continued campaign, was then formed to march upon Guélèba and the Nafana country, hitherto almost unexplored and in relation to which only the most vague information was obtainable. This column included 103 mounted Europeans, men and officers, four companies of native tirailleurs, a squadron and a half of Spahis cavalry, and 800 porters, carrying on their heads burdens of from 22 to 25 kilogrammes, equivalent to 30 days' provisions for the Europeans and six days' supplies for the native African troops and bearers.

Leaving the Babila ford on the 4th February, this column took its way rapidly to the east, where it surprised at Guélèba, the principal bands of the Almamy, particularly that of the chief N'Golo, who suffered considerable losses, and Colonel Combes thus obtained possession of large stores of provisions which were calculated to feed his native followers as well as troops for a long time.

The bands of Samory always retreated fighting, they disputed the passes, the fords, marigots, and rivers; burning as they fled all the villages on the way with their stores of provisions, driving before them like flocks of cattle the unfortunate inhabitants terrified by the cold-blooded cruelty of the Almamy. The French column, which marched early and late, often covered a distance of from 40 to 45 kilomètres, through a country full of natural obstacles, thereby overtaking the Sofas, who were thus surprised time after time whilst in the act of throwing up defences, palisades, entanglements of creepers, etc., at different points in the road, obstacles which, thanks to the rapidity of the French pursuit, were only just commenced and never advanced to completion.

In consequence of this energetic system of harassing the retreat of the enemy, which was kept up with wonderful perseverance and devo-

tion on the part of all his men, Colonel Combes was enabled to cause the enemy immense losses in men, horses, rice, honey, and Kola nuts, provisions which largely assisted the food supply of the French natives, soldiers, and bearers, and also enabled the regulation rations of the white troops to be improved by abundant distributions of rice.

From Guéléba the column marched towards the south-east towards the Nafana, a country thickly wooded with the strong vegetation of the tropics, a country covered with jungle impassable except where the narrow pathways under the trees seemed at times almost indistinguishable, and apparently inextricable. In addition it may be noted that this difficult country is inhabited by a black race almost savage, and intersected by deep streams, full of water throughout the year, for it rains here for 10 months out of the 12.

This Nafana country was entirely traversed from north to south, and a region was arrived at wholly unknown to Europeans (where the inhabitants build their huts up in the trees, for the purpose, as we may suppose, of being out of reach of inundations), and the fighting throughout was incessant. The great danger for the French was their liability to be fired upon, anywhere and everywhere, from an enemy totally hidden in the luxuriant vegetation.

After having caused as much damage as possible to the enemy the column retraced its steps. During this fantastic march the French troops fought in 14 actions, on all of which occasions the enemy suffered severe losses. They marched nearly 900 kilomètres, crossed 172 (*marigots*), nullahs with steep banks and full of water, 13 large rivers, and re-entered the post of Kérouané on the 33rd day, on the 10th March, 1893, *without having lost a single European.* They had two men of the Foreign Legion wounded, four tirailleurs and Spahis killed, and 15 natives wounded. It was a remarkable exploit, a veritable epic ! The Sofas were stupified with astonishment and fear, whilst they still more firmly believed that *Coumbo* was the very devil indeed.

Minor Operations against Samory.

Whilst Colonel Combes was thus pursuing in the east the bands which Samory commanded in person, Captain Briquelot was operating in the upper valley of the Niger against the bands of the "elder Bilali."

After his first day's march in the enemy's country Captain Briquelot was obliged to leave his guns in a post, on account of the delays which they occasioned in such a difficult country, where it is imperative to make rapid marches to be successful.

After the fights of Douako and of Yalinkoro (on the 14th and 24th January, 1893), Bilali and his bands were driven out to the south, towards the Kissi, whither the small column pursued them, again giving them a beating on the 3rd February at Bambaya. Bilali, turned out of this place, thoroughly disabled and disheartened, would then have taken refuge in the thick forests to the west of the Kissi, but he was prevented by so doing by the inhabitants, who, rising at the approach of the French, attacked the demoralised Sofas and massacred them in large numbers in their villages wherever scattered groups of them had

taken shelter. Bilali and his few remaining faithful followers made their way back towards the north-west, where they were completely defeated, on the 5th February, in a fight at Nianforando near Erimankono. The old Bilali escaped falling into the hands of the French, and owed his safety to the speed of his horse. In his precipitate flight he had not time to saddle his animal, and in this pitiable state he reached the frontier and took refuge in the British territory of Sierra Leone. All his baggage, supplies, and 4000 prisoners fell into the hands of the French. Among his papers were found some of great importance, written both *in Arabic and in English text*, which will serve some day (says the chronicler) to explain fully the change of Samory's policy in his relations with France.

On the 10th February, Captain Briquelot's force arrived at Erimankono, a charming spot, where the establishment of a post was proceeded with, which, when completed, will stop any attempt of Samory to reinstal himself in this region. At the same time another post was constructed at Farannah, 40 kilomètres to the east on the banks of the actual Niger itself. It was then learnt that the old Bilali had left the Sierra Leone territory, where he had obtained assistance and was again in the field with the band of Bakary-Touré which he had joined.

The French operations re-commenced on the 1st March, when they attacked the enemy at Guérineba, where he sustained severe losses. The column next marched in a southerly direction towards Bambaya, where Bakary-Touré had taken refuge, which place was reached on the 18th March, directly after the enemy had struck their camp. But the Sofas drive before them such numbers of the inhabitants that it is easy to follow in their track. The trodden down vegetation in their passage forms, in fact, a broad road more than 20 yards broad. By the 20th March the large village of Yalé-Kalédou was occupied by the French, and a large accumulation of supplies and provisions of all kinds were found there.

The French then experienced much difficulty in passing the Ouassouko, a marigot strongly entrenched, which the enemy defended for more than 30 minutes. This obstacle having been surmounted the pursuit of the Sofas was continued with vigour, their march being impeded by the numerous troops of slaves and cattle which they took with them. At last during one dark and rainy night the French surprised the African camp, which the Sofas at once abandoned with all their belongings, and where the French made 4500 prisoners (surely including the slaves ?). After a little sharp fighting the Sofa bands retreated in disorder towards Bouillé, pursued by the Spahis under Lieutenant Pouydebat, who utterly cut them up and dispersed them.

These bands, like those of the Kissi, beaten everywhere, disheartened, and altogether demoralised, deserted the country in small detachments towards the north-west, by the Milo, where they only encountered fresh difficulties.

Meantime Captain Dargeles, commanding the little column of the Kissi, was then operating in the vicinity where Captain Briquelot was cutting up the bands of the "old" Bilali. This column, composed of a section of the Foreign Legion, two companies of native tirailleurs,

one troop of Spahis, and 300 transport coolies, was busily engaged in the Kouranko and in the Kissi country against the bands of Ténesso-Koba, of the younger Bilali, and of Amara, one of the sons of Samory. This column had left Babila on the 29th January. After making some arduous marches through a mountainous country this column arrived before Fidaoua, a large village, fortified by means of stockades and *sanies* or *sagnes* (*vide ante*), block-houses, as usual throughout these regions. The enemy, commanded by the son of Samory, had there constructed very formidable defences. Here again the Lebel rifles, in default of artillery, contributed largely to the demoralisation of the Sofas, who were killed by the small bore elongated projectiles easily penetrating the wooden planks of the stockades. Finally, the village was carried at the point of the bayonet, and the enemy suffered largely in killed and wounded, including many chiefs. The son of the Almamy was shot through the body, and only owed his safety to his faithful slaves who carried him off into the bush. The resistance was soon overcome and upwards of 11,000 prisoners were captured.

These figures appear incredible, but it may be explained that these prisoners were the captives whom the Sofas used to exchange for arms and cattle. These unfortunate wretches were conducted into the peaceful regions of the Soudan and set at liberty. At the present time they inhabit peaceful villages and engage in agriculture, under French rule and protection.

On the 12th February, the section of the Foreign Legion was sent back to Kérouané, and the column kept on its way visiting and scouring the neighbouring country and driving out the scattered remnants of the Sofas.

The delivered inhabitants everywhere came out to entreat the French to occupy their country and to rid them permanently of the presence of Samory's soldiers. By the 6th March Captain Dargeles was able to re-enter Kérouané.

The effect of this double hammering of the bands in the Kouranko and on the Kissi was to totally crumple up the columns of Bilali and Ténesso-Koba, and to reduce the masses of the enemy into little bands and scattered parties, who wandered fruitlessly in the territories between the Niger to the south-west and north-west, and by the Milo to the east. Instinctively they, by degrees, ended in making for the Milo to cross the several practicable fords, and at last joined the bulk of Samory's forces beyond that river.

Indeed, as already recorded above, Colonel Combes had taken the precaution to guard by the posts of observation, established at Kénimbourg, Maréna, Mananfara, and Babila, the line of the Milo in such a way that these disunited detachments fell, one after the other, within the defensive zone of these posts and suffered accordingly.

Thus, on the 7th May, it was foreseen that one troop, formed of the *débris* of several scattered bodies of Ténesso-Koba and Amara's men, intended to penetrate by night through a pass between the posts of Mananfara and Babyla. In consequence of the dispositions made by Lieutenant Delaverrerie and Doctor Duforey, in medical charge of the column, the Sofas were duly surprised and again completely defeated.

Ténesso-Koba and Amara lost their state war cloaks, 20 valued captives, all their papers, Korans, and their wives, etc. A few of them who managed to cut through, including the mother of Amara, joined Samory himself on the Dion, after having barely escaped capture by a detachment of Spahis under Lieutenant Hautecloque, who hotly pursued them. The old Bilali encountered a similarly hot reception, in the same fashion, shortly afterwards.

So in less than three months the expeditionary column had cleared of all Sofas the whole country west of the Milo river. The remnants of the large masses of troops which Bilali and Ténesso-Koba had so long maintained on the Upper Niger were destroyed, and by the construction of the posts of Farannah, of Erimankono, and Kissidougou, the Soudan was in a position to prevent Samory from easily providing himself with arms and ammunition from the English traders of Sierra Leone.

At the beginning of April Colonel Combes ordered the return of the column to Sénégal. But previously he visited the posts newly established, selected a locality for the Residency on the Kissi, and despatched Captain Briquelot with Doctor Gallas and 100 tirailleurs to completely explore a route wholly within French territory which should open up communication with the coast. Accordingly Captain Briquelot set out on the 8th April from Farannah, and reached Konakry without encountering any opposition.

It is to be remarked that this notable campaign, which only lasted three months, and achieved such important results, cost the life of one European alone, a soldier of the Foreign Legion, who was killed at the taking of Fidaoua.

Colonel Archinard's Operations in Ségou and Macina.

Whilst these events were transpiring in the south of the French Soudan, events of serious importance were taking place in the north-west region. Colonel Archinard, who arrived in the Soudan on the 23rd January, soon learnt the death of Mounirou, the Sultan of Macina, to whose throne Ahmadou, that old antagonist to the French, immediately succeeded. He at once made a hasty tour of inspection and proceeded as soon as possible to Nioro, the capital of the Kaarta, where a re-organisation of the provincial administration was necessary. He found the country quiet, the fields being cultivated and trade with the Moors of the Sahara desert in full operation. Nioro, in fact, is an important trade centre. The nomadic tribes of the desert come there to sell their herds of cattle, their gums, salt from the Saharan salt-licks, etc., and such is the importance of the commerce that the value of the customs dues collected on the sales of cattle, horses, and salt alone is estimated at 400,000 francs annually, *i.e.*, £16,000.

The populations of the Kaarta is estimated at from 50,000 to 60,000 inhabitants, with 1000 oxen and 300,000 sheep. Indeed, Captain Sansarric, commanding the district, after a very careful survey of the locality, puts the numbers of inhabitants at 150,000. Such a discrepancy may appear surprising, if it was not well known that the black people greatly dread the imposition of a capitation tax, and resent all inquiry

by depreciating their own numbers and that of their cattle. A given village will be said to have 198 inhabitants which in reality contains 3000 or 4000. The importance of the trade and the commercial activity may be estimated from the amount of the revenue actually collected, as given above.

It is very clear that this activity in commerce is a good deal dependable on the attitude of the Moorish tribes. Whenever these Moors pillage a caravan the commerce is arrested, or much interrupted. The Ouled Nacer tribes, for example, still remained untameable. Colonel Archinard took immediate action. He at once prohibited, under the most severe penalties, the exportation of millet from the Kaarta over the border anywhere in their direction, for the Ouled Nacer Moors are themselves unable to cultivate the grain which forms the base of their food supply. At the end of three weeks their chief came to Nioro with 300 men and 500 camels, and consented, in token of submission, to pay the French an annual tribute of 10 horses.

The senior commandant left Nioro on the 17th February, taking with him two small guns which he had left there in 1891. He proceeded towards Gombou where he arrived on the 27th February. There El Hadj Bougouni, whom Commandant Bonnier had well beaten six months previously at Doséguéla, came in to make his submission. Next, Colonel Archinard went on to Ségou, which he reached on the 14th March. There he learnt that the feebleness of Bodian, on one hand, and the intrigues of Ahmadou, on the other, had together resulted in new uprising of the Bendougou and the neighbouring provinces of the Baninko and Minianka, whither had retired the bands of the Peuhls which had been broken up by Commandant Bonnier during the previous month of June. Colonel Archinard did not hesitate to depose Bodian (to whom, however, he still showed great marks of regard) and to put at the head of the Ségou district a French officer, whilst a column was organised to operate in the disturbed districts. With two companies of regulars, Sénégal tirailleurs and four companies of auxiliaries the senior commandant marched to the south directly upon Baninko. At Garo he crossed the Mayel-Balével, and on the 28th March, after some few preliminary skirmishes, he beat the rebels at Kentieri. The next day he pursued the fugitives and completely defeated them at Mpesoba. After this fresh defeat the revolted Bambarras understood that it would be better to submit, and they delivered up the Peuhl chief who the previous year had led the revolt of Guénié Kalari.

From Mpesoba the Colonel pushed on north-east, towards the town of San, whose chiefs, for a long time allies of the French had, it will be remembered, concluded with the Commandant Monteil a treaty acknowledging the French protectorate. The Almamy of San came to meet the French column and facilitated the provisioning of the troops. But this did not occur at Djenné when they arrived on the 11th April after having re-crossed the Mayel-Balével at the height of Touara.

Djenné is a big town of 10,000 to 12,000 inhabitants on the borders of the Mayel-Balével, which communicates with the Niger by a navig-

able *marigot*. It is a very important commercial centre under the suzerainty of Macina, and, indeed, is to the populations of the Upper Niger what Timbuctoo is to the populations of Sahara. Ahmadou, who had prepared for an invasion of Ségou, was at Mopti, 50 kilomètres to the north-east, with his contingents.

In spite of the king's proximity, the *Toucouleur* garrison of Djenné were not anxious to resist and to match themselves with the chief who had knocked down so many Toucouleur citadels. But the traders of Djenné, deceived by the weak appearance of the column marching *en masse*, thought themselves strong enough to beat the French and a determined resistance was prepared, a resistance which was all the more intense that Djenné is like Timbuctoo, a town celebrated for its Mussulman schools, of which there are 16. On the 15th Colonel Archinard, informed of all this, had his guns placed in position and began to bombard the military portion of the town, which is situated to the west of the mercantile town. On the 12th, the breach being sufficiently practicable, the assault was delivered. The struggle was terrible. Two French officers were killed, Captain Lespieau and Lieutenant Dugast; the native contingents lost about 30 men and there were many wounded. But the enemy lost between 400 and 500 dead, and before the end of the day the principal merchants, terror-struck, implored and obtained the cessation of the slaughter. In order to conciliate the inhabitants of Djenné, Colonel Archinard had avoided bombarding the mercantile town, so that the next day material order could be re-established, and the merchants got out of it with a heavy war indemnity which they made haste to pay on the spot.

The Toucouleur garrison had fled with their chief Alpha Mouça. The column started in pursuit the day after, and, after passing for the second time the right bank of the Mayel-Balével, on the 17th April, entered Mopti, which the troops of Ahmadou had just evacuated. The chiefs of Macina, foreseeing that Colonel Archinard would march upon Bandiagara, the capital, had concentrated their forces on the road from Mopti to Bandiagara. It was actually at Kori-Kori that the encounter took place. It recalled, in fact, the affair of Youri, on the 3rd January, 1891, when the troops of Kaarta were crushed. The French had only four tirailleurs wounded after a short struggle, in the midst of which Ahmadou took flight. The king of Macina at once abandoned his capital, taking all his family in the direction of the Haoussas States. But Colonel Archinard, having entered Bandiagara on the 29th April, detached a flying column to pursue the fugitives, caught them up at the defile of Dalla, at a considerably long distance to the east of Bandiagara, and finally captured the *smala* of Ahmadou. The son of El Hadj Omar continued his flight almost alone; his prestige was so irreparably damaged that Ali-Bouri, one of his most devoted adherents, submitted himself to French authority.

Although the last of the Bambarra States conquered by El Hadj Omar, the kingdom of Macina has remained much attached to the family of the Toucouleur conquerors. The Peuhls are numerous at Macina, but by the side of them exists a very valiant and very independent population, which inhabits the steep hills of the country. The

Habés were at war with the Peuhls who, coming from the valley of the Niger, had little by little driven them back to the mountainous region. El Hadj Omar had attached to himself these sedentary populations upon whom one could acquire more hold than upon the Peuhl shepherds. He fixed the capital of Macina at Bandiagara at a certain distance from the Niger, and it was during a revolt of Peuhls that the celebrated prophet was killed. The result of all these different actions was a great affection on the part of the Habés for the family of El Hadj Omar, whom they considered their Liberator. Under these conditions Colonel Archinard thought that it would be suitable to place on the throne of Macina a member of the great Toucouleur family; he, therefore, gave the crown to Aguibou, a son of El Hadj Omar, consequently a brother of Ahmadou, and who for the last four or five years, when he was governing the province of Dinguiray, gave fairly satisfactory proofs of his friendly attitude.

The 5th May the Colonel quitted Bandiagara, leaving as Resident with Aguibou, Captain. Blachère, who lately died, and has been replaced by Lieutenant Bouvreau and a strong company of tirailleurs. It may be hoped that tranquility will not be disturbed in that region, for the Peuhls, under the chief Ahmat-Sala, accompanied the French column in its march upon Bandiagara.

On returning towards Ségou, Colonel Archinard made his way to Sansanding, and there, as at Ségou, he had to proceed to a re-organisation of the country, the fama Mademba not having been able to impose his authority upon his subjects. The kingdom of Sansanding was materially reduced, and the territories of Ségala, of Monimpe, and of Mampala form, with Sokolo, the new district of Sokoto.

From Sansanding Colonel Achinard passed to Ségou, where he resided from the 19th to the 23rd May, to Bammako, where he arrived on the 29th May, and he was at Kayes in the middle of the following month. It was on returning to France, it is to be remembered, that he was attacked at Podor with an attack of bilious fever which so seriously shook his health.

Results of the Campaign, 1892–93.

The campaign of the north-east happily completed that of Colonel Combes, and the effect of the rapid intervention in Macina and the deposition of Ahmadou dissipated a very threatening invasion which was preparing afresh on the side of Ségou. Finally, the installation of the French at Djenné, where there is a post commanded by Captain Gauteron, *commandant de circle*, the establishment at Mopti of the Niger flotilla, under orders of Lieutenant de Vaisseau, Boiteux, give the French a preponderant situation in the valley of the Niger.

The region of Macina has entered into the sphere of the direct French influence, and it is well-known that it is at Macina where the key of Timbuctou is to be found. The great Saharan town, where, in spite of all that has been said, an active commerce is maintained, cannot exist without Macina, which supplies all its provisions; it cannot do any trade without Djenné, which the productions introduces of southern Soudan and concentrates the productions of western Sahara.

The people of Timbuctou have been ever widely awake on this point, and as soon as Djenné was taken they sent emissaries to Colonel Achinard protesting their desire to be at peace with the French so that it may be expected that some day, providing the French act with wisdom, Timbuctou will open her gates of her own accord to the protectorate of France. The Colonels Archinard and Combes have thus for good and all thoroughly settled French predominance in the Soudan, and obtained in a few months and without a great sacrifice of men unhoped for results which guarantee relative security in the regions situated on the right bank of the Niger, and complete security for the territories under the direct authority of France.

At this moment Soudan, by reason of its territorial development, is divided into three great regions:—Nioro (Commandant Claude), which comprises the northern circles; Ségou (Commandant Brisse), with the eastern circles, Djenné, Bandiagara, etc.; lastly, Siguiri (Commandant Rochard) to which the French posts in southern Soudan are attached.

Kayes remains the capital of French Soudan, and it is there Lieut.-Colonel Bonnier resided till lately, superior officer *par interim*.

Movements on the Frontiers, 1893–94.

It has been shown how, in 1893, whilst Colonel Combes—the dreaded "Coumbo" of the Sofas—was pursuing Samory in the valleys of the Milo, of the Sankaran, and of the Bani, those large southern affluents of the Niger, Captains Briquelot and Dargelos, at the head of flying columns, destroyed the bands of marauding Sofas which Kemoko-Bilali, Samory's principal lieutenant, had established on the Upper Niger.

The centre of Bilali's operations, the large village of Erimankono, was occupied by Captain Briquelot, who established there a post; and, in order to prevent any renewal of offensive movements on the part of the enemy, other military stations were likewise established in the basin of the Niger, at Farannah (a village situated at the confluence of the river of Erimankono and the Niger), and at Mafendi-Cabaya, a village which lies in the triangle formed by the two superior branches of the Niger, viz., the Falico and the Tembi. In the few maps (which, indeed, are not precisely accurate) which we have of this region, this territory seems to be a dependency of that province of Kouranko which Samory had conquered some years ago, and which extends beyond the watershed of the Atlantic streams belonging to the British colony of Sierra Leone as well as into the basin of the Upper Niger, which forms an integral portion of the French Soudan.

In fact, in order to keep a better surveillance over the caravans going from the regions still occupied by Samory to the commercial centres of Sierra Leone, and likewise to prevent, should any such case occur, the import of arms and ammunition, it was resolved to establish an advanced post further to the south than that at Mafendi-Cabaya, which could then be disestablished.

The operations so far effected in French territory had resulted in the complete dislocation of Samory's bands of Sofas. Some warriors passing the French lines had been able to rejoin the Almamy's contingents

ANGLO-FRENCH BOUNDARY NEAR SIERRA-LEONE. II.

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concentrated in the neighbourhood of Ténetou at more than 500 kilomètres to the north-east, where his son, Karamoko, assembled them in the Bouzie, near Mousardou. But a large number of Sofas were thrown back into the British territory of Sierra Leone, where they pursued their habitual depredations. In order to destroy these hordes which had thus collected inside their colonial frontier the British Governor of Sierra Leone, Sir F. Fleming, modifying his former attitude with regard to these disbanded troops of Samory, decided now all of a sudden to establish in close proximity to the English frontier a chain of posts parallel to the French line. Caglieri, Falaba, Dangowalé, Sangbé, were also furnished with garrisons of black troops, native police, and West India regiments. The establishment of these last two stations only dates from the middle of last year. In addition, it was decided that an expeditionary column should be sent to the front to drive out the colony of Sofas who had established themselves within the colony. This column, consisting of 400 men of the 1st Battalion West India Regiment and colonial police, in charge of Captain Lendy, was placed under the command of Colonel Ellis, and proceeded inland last November, *viâ* Bendu and the valley of the River Boum.

It is 10 years since the question of the frontier line between Sierra Leone and the French Soudan became a subject for *pourparlers* between the Governments of Great Britain and France. For the treaty of 1882, which was rightly disapproved by the French Chamber of Deputies, a new agreement was come to in August, 1889, which was ratified by both parties, the final ratification having been signed by the French Cabinet on the 12th March, 1890. By this instrument the frontier was determined—on the map!—between the French Guinea coast and the colony of Sierra Leone. Some time afterwards, on the 20th June, 1891, the French and English commissioners, MM. G. Hanotaux and J. Haussmann, with Messrs. Egerton and Crowe, completed the work of 1889 in precisely specifying the frontier line between Sierra Leone and the French Soudan, as follows:—

"The commissioners, experts, who may be designated by the French and English Governments, in accordance with Article 2 of the Convention of 10th August, 1889, for the purpose of tracing the demarcation of the respective zones, will follow, as nearly as possible, that which is indicated in the said arrangement, viz., the line of the meridian 13° west from Paris (*i.e.*, 10° 39′ 45″ from Greenwich), beginning from the 10th degree of latitude towards the south. In laying down the frontier in the general direction of this meridian they take into account, by mutual agreement, the configuration of the ground and local circumstances, and bend the line of demarcation either to the east or west, taking care not to give any advantage to one of the two territories without equitable compensation for the other. These modifications, however, will not be definitely determined until after ratification by the two Governments.

"It is understood that the line of demarcation shall follow, as nearly as possible, the crest of the heights which, according to the *Monteil* map, border on the course of the Niger on the left bank between the 10th degree and Tembi-Counda.

"Nevertheless, in cases where the line of partition of the waters shall not be such as shown on the Montiel map, the commissioners of the two countries must trace the frontier without taking it into account, under the express reservation that the two banks of the Niger shall remain included within the French zone of influence.

"By the term "Niger," is to be understood the Djoliba, as well as its two principal sources, the Faliko and the Tembi. In the before-mentioned case the frontier line, starting from the 10th degree as far as Tembi-Counda (the mountain where the Tembi takes its rise), shall follow at a distance of 10 kilomètres the left bank of the Djoliba, of of the Faliko, and also of the Tembi up to its source, if it is expedient. In cases where the crest of the mountains shall be found nearer approached to the left bank of the Niger the frontier will follow the line of parting of the waters."

It will be remembered that in carrying out this arrangement a mixed commission was sent into Africa. The French delegate was M. Lamadon, who had as technical colleague Lieutenant Bransoulée. The English delegate was Captain A. H. Kenney, Royal Engineers.

The terms of agreement, unfortunately, could not be effected on the ground. Captain Kenney took up the same attitude which had been assumed by Captain Laing, his colleague, in the mission for the delimitation of the Gold Coast frontier, where the French delegate was Captain Binger. On the return of the commissioners the diplomatic negotiations were obliged to be resumed, and at last were brought to a conclusion.

The frontier of the English Gold Coast has been, for some months past, determined, to the entire satisfaction both of the French Government and our own. It has been the same, we believe, with the frontier of Sierra Leone.[1] If our information is correct, the protocol ought to be signed in the course of February, and it has only been awaiting the return of one of the French commissioners, M. Jacques Haussmann, till lately on a mission to Berlin.

The question of Erimankono, about which there has been some little stir in Sierra Leone and in England, has been settled conformably to the claim of France, as this village is in the basin of the Niger.

It was under the above circumstances that the recent collision between the native Sénégal tirailleurs and the English force, under Colonel Ellis, took place near the French frontier.

It was somewhere near here last summer that Lieut. Gaston Maxime Maritz was stationed under Captain Bouvie, who was in charge of the post of Farannah, on the Upper Niger, within a few miles of the north-east corner of the Sierra Leone frontier. In September he left with a small force of Sénégal tirailleurs and natives, and proceeded to patrol southwards, *viâ* Liah, Cabaya, Fodoya, Selia, to Socora, on the Falico river. Thence he followed up the valley of the Falico to Mari-

[1] The map of the Anglo-French boundary near Sierra Leone, in accordance with Anglo-French agreement of 1889 and convention of June 1891, surveyed by British delimitation commission in December, 1891, and in January, February and March 1892, in eight sheets, on a scale of two miles to an inch, was completed in May 1892, at the Ordnance Survey Office, Southampton, and issued by the Intelligence Division War Office.

In this map, however, only the northern boundary line, in latitude 10° north, is shown.

colaya and Sambadougou, in the Kouranko country, in search of the Sofas under Bakary-Tourré, who were devastating the Kono country across the British frontier. Maritz's march was continued to Morabaya, across the stream of the Babbe, and along the watershed between the source of the Babbe and the Falico. He next reached Birimba, Tantafarra, and Walbabba, at the source of the Babbe. When he got down south as far as Foria and Tembi-Counda, at the head waters of the Niger, he was right in the angle of the frontier line, and here he halted on December 21st. Some stragglers from the bands of Sofas (which had been driven by the British out of Sedu on the 20th, from the east side of the Daro Peak, a conspicuous point of the Kong Mountains), in order to facilitate the escape of Bakary-Tourré, who had doubled back towards the Kouranko country, gave information to Maritz that the Sofas were encamped at Warina, west of Tembi-Counda, and north of Daro Mount, and a good opportunity for a surprise attack upon them was not to be lost, even if the Sofas were across the frontier, for now they were foes to the British as well as to the French. Maritz at once marched, and halted on the 22nd within a few miles of Warina, where the camp of the Sofas was indicated to him. After midnight he started again, and, with a full moon to assist his march, was able to deliver his attack on the camp at 4.30 a.m. on the morning of the 23rd. Ten of his men were killed, and he, himself mortally wounded, only discovered before he died that he had been attacking the British West India Regiment and the Sierra Leone Frontier Police, under Colonel Ellis.

Colonel Ellis reports that on the 13th December he sent in duplicate, by different routes, notice of his operations against the Sofas on the frontier, to the French officer commanding in Kissi country (whose head-quarters would be at Kissidougou, some considerable distance from the scene of action). On the same date he advanced from Banguma, in the Bambarra country, 140 miles from Bendu, and reached Kommendi, 39 miles to the north-east, on the 14th. From hence a flying column, 270 strong, left on the 17th, and proceeded across a wide stretch of country devastated by the Sofas, passing the ruins of two large villages. On the 18th the column crossed the mountain chain south of the Daro Peak; and, on the following day, surprised the Sofas and drove them off, during which operation Lieutenant Gwynn, Royal Engineers, was wounded. The same evening Colonel Ellis camped at Yelladu, the most easterly position reached. From Yelladu the line of march was directed, north-west, to Sedu, out of which village the Sofas were driven, when Lieutenant Margesson and three privates were wounded. On the 21st the column re-crossed the mountains north of the peak, the Sofas fleeing before the advancing force, and the village of Warina (14 miles north-west of Sedu) was occupied, cleared, and put in a state of defence, with abattis, etc. During this day's work eight men of the West India Regiment were wounded. On the 22nd, the main road, communicating direct with Kommendi, was opened up and supplies of rum and tobacco brought up, although by some untoward error the rations of beef and bread were not forthcoming.

At about 4.30 a.m. on the 23rd, Saturday morning, an alarm was

given, and the men turned out; but they had scarcely got into position when a volley was fired into them. This was at once replied to. On fire slackening, an advance was made, when a wounded prisoner reported that the attacking party was that of Lieutenant Maritz, consisting of 30 Sénégalais tirailleurs and 1200 natives of Kissi.

Lieutenants Liston and Wroughton, West India Regiment, and Captain Lendy, of the Constabulary, were killed in action, together with Sergeant-Major Carraher and six privates; whilst Sergeant-Major Field and 17 privates were wounded. Lieutenant Maritz was rendered all possible surgical assistance, but died at noon on the same day. The whole affair was due to a wretched mistake, and the friendly relations with our neighbours, the French, are not likely to be disturbed by this lamentable occurrence on the debateable frontier line. Since this affair at Warina another petty collision between French and the Colonial Constabulary of Sierra Leone has been reported as taking place in Samoh, north of Free Town; but no importance need be attached to such a trivial affair. Some excitement, however, seems to have prevailed at Monrovia in consequence of the French flag having been hoisted on the Cavally river, at the eastern extremity of Liberia. There is no doubt that the French will turn this river to better account than the Liberians can possibly do, and it is altogether beyond our British sphere of action and influence, but the left bank only is in their territory.

Occupation of Timbuctou.

Let us now turn from the south-west to the extreme north-east of the Soudan-Français.

It has been shown above how Kayes (marked on English maps as Medine) had been selected as the capital of the French Soudan, of which province M. Albert Grodet was appointed Civil Governor, with Lieut.-Colonel Bonnier as senior commanding officer of the military forces in the district. On the 12th November, 1893, when the season favourable for operations set in, the annual expeditionary column, under Colonel Bonnier, left Kayes towards the east, where the Almamy of the Sofas was reported as having fixed his quarters. It was not, however until the 6th and 7th of December that the French troops came up with their old enemy, Samory, and two engagements took place on these two successive days, on the last of which the Almamy again nearly fell into the hands of his pursuers, being only saved by the speed of his horse; and after the fight the French encamped at Faragaré, where the river Koli-Koli[1] flows into the magnificent Lake Dhebo, into which the Niger debouches, and it now became known to the troops that their objective was Timbuctou, towards which capital their next marches were directed.

Meantime there appears to have been no little rivalry between the flying column on shore and the flotilla of gunboats on the river as to which branch of the service the honour of first entering the capital of the Touaregs and the great mart of the Sahara should belong. Naturally Lieutenant Boiteux, of the gunboat *Mage*, commandant of the

[1] "Oulou-Oulou" on French map.

flotilla, was anxious for his force to have an opportunity of distinguishing itself; and, instead of a pre-arranged movement between the combined military and naval contingents being concerted by their respective leaders, Lieutenant Boiteux had pushed on with his boats for Koriomé, the port of Timbuctou, which large town lies at some little distance from the left bank of the Niger. The river had been surveyed as far as this point by Lieutenant Caron, of the *Niger*, in August, 1887, and therefore the ground was well known.

Timbuctou was, till lately, ruled by a *djemaa*, or association of merchants, but latterly this corporation had been suppressed by different chiefs, who were supported by the Touaregs; although Alimsar, the great Touareg chief, did not care to concern himself with the petty mercantile affairs of the town, but it was rightly surmised that the Touaregs of the neighbourhood would assume an aggressive attitude on the approach of a French army of occupation. Lieutenant Boiteux would hardly act without some support from land forces, and it is suggested by the correspondent of "*Le Temps*" that there may have been in the vicinity some French detachments under Colonel Joffre, who is known to have been exploring north of the Niger for the railway extension from Bafoulabé, and these troops may possibly have been co-operating with the flotilla. At all events, it appears that M. Aube, Lieutenant Boiteux's second in command on the gunboat *Mage*, was sent with a landing party, composed almost entirely of native Laptots, to reconnoitre Kabara, outside Timbuctou; and, on reaching Mopti, Colonel Bonnier reports that he heard of this party having been cut up by the Touaregs in the plain of Kabara on the 28th December, 1893, when he at once pushed on his main column, which entered, without resistance, the great mart of the Sahara, the key of the desert extending to Tunis and Algiers, the mysterious city of Timbuctou, on the 10th January, 1894. No further complications or movements against this easy occupation were anticipated by the officer commanding the column, for deputations from the surrounding tribes were arriving to give in their submission; but it is added that this occupation, indeed the whole movement on Timbuctou, was ordered by Colonel Bonnier and M. Boiteux without, if not in defiance of, orders from M. Albert Grodet, the Civil Governor of the Soudan; and it is said that Colonel Bonnier had already been ordered back to France, but that he effected this *coup* previous to leaving the country. In Sénégal likewise, the Governor, M. de Lamothe, has been in conflict with General Caronnat, commanding the troops; and this dualism between the civil and military authorities has led to unfortunate results, although the Home Government has signalled its determination to uphold the supreme position of the civil authority by annulliug a notable *ordre du jour* issued by the General on the 23rd December, 1893. Nevertheless, the tricolor flies in Timbuctou, and the Civil Governor of the Soudan will hardly be able to draw back now that the possession of that important capital has been effected so easily. Besides, the prestige which must accrue to the French army throughout all Mahomedan Africa is a most important consideration, apart from the material wealth which a hold on the centre of trade, where the food products of the rich Niger valley

are obtained by the nomad tribes of the desert, entails to the captors.

Such is the account of recent French progress in the Soudan of Western Africa, and it remains for us to watch what will be the next step taken by our neighbours in this region. A serious problem presents itself to the French colonial administration on which we outsiders are, at all events, incompetent to give an opinion. However, the foregoing brief summary of the position of affairs in these regions will serve to inform our readers how active the French officers have been, and with what intelligence they have acquired their potent influence over the valley of the Niger. Indeed, it is not altogether flattering to our pride if we contrast the manner in which the French have thus successfully contended with Mahommedan and fanatical populations on the banks of the Niger with our unsuccess and notable miscomprehension of the somewhat similar situation on the banks of the Upper Nile. It is possible we may learn a lesson from this narrative of the French arms in French Soudan, a creditable record for any military European Power.

The Disaster at Dougoi.

Since the foregoing account has been printed, M. Maurice Lebon, the Under Secretary of State for the Colonies, has published the following telegraphic despatch from M. Albert Grodet at Kayes:— [No date quoted!]

"I beg to forward you, herewith, the following despatch which has just reached me from Captain Philippe, commanding the post at Timbuctou:—

'The column under Col. Bonnier arrived here on the 10th January. A portion of the column started, on the morning of the 12th, to make a reconnaissance in the direction of a Touareg encampment, under the command of Colonel Bonnier, with Commandant Hugueny, all the staff, the 5th company, and a detachment of the 11th.

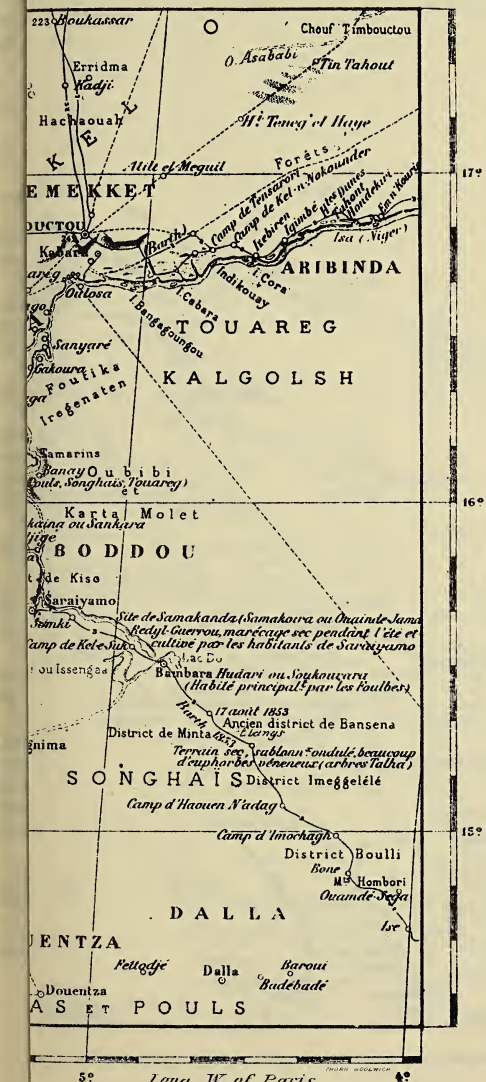
I was left in command of the post, as being the most senior captain. The column has been surprised whilst asleep in camp at Dougoi, at about two hours' march to the north of Gotedam (probably the 'Goundam' of Fortin's map), which is three days' march from Timbuctou.

The Touaregs, mounted and followed by men on foot, armed with lances and knives, entered on several sides, overthrowing the line of piled arms in front of the tirailleurs, who could not get at their rifles.

Captain Nigotte, wounded in the head, was able to escape and rejoin a detachment, left a good many kilomètres to the rear, guarding the cattle which had been captured, under the command of Sub-Lieutenant Sarda. He returned here on the 17th, carrying the news and bringing back a detachment of the 5th and 11th companies, and a number of tirailleurs who had fled; several of them were wounded, and three severely.

We have been able since to recover some men. But we have been forced to limit considerably the reconnaissances and research, by the necessity of securing the place.

The Touaregs soon came to prowl, in numerous parties, about the environs nearly approaching the town, forming a circle, appearing, then disappearing before our troops.


Houkassar
Chouf Timbouctou
O Asababi
Tin Tahout
Erridma
Kadji
Hachaouah
Mts Tenez et Haye
Mile et Meguil
Forêts
EMEKKET
17°
DUCTOU
Kabara
Rivière
Camp de Benaouri
Camp de Kel n Nokoudder
Tombouctou
Isa (Nigre)
ARIBINDA
Oillosa
Indikouay
Cora
Cabara
TOUAREG
Sanyaré
Bangagoungou
Takoura
Poulika
KALGOLSH
Iregenaten
Samarins
Bancy Oubibi
(Foule, Songhais, Touareg)
16°
Karta Molet
(Kaina ou Sankara
Fuige)
BODDOU
de Kiso
Saraiyamo
Site de Samakanda (Samakoura ou Onainule Sama
Kedyl Guerrou, marécage sec pendant l'été et
cultivé par les habitants de Saraiyamo
Kel e Sikk
Lac Do
Bambara Hudari ou Soukouyara
(Habité principalt par les Foulbes)
17 août 1853
Ancien district de Bansena
District de Minta
Terrain sec, sablonneux ondulé, beaucoup
d'caphorbes vénéneux (arbres Talha)
SONGHAIS
District Imeggelélé
Camp d'Haouen N'adag
15°
Camp d'Imochagh
District Boulli
Bone
Hombori
Ouande Sedja
DALLA
Lac
ENTZA
Fellodjé
Dalla
Barouï
Badebadé
Douentza
AS ET POULS
5°
Long. W of Paris.
4°

MACINA AND ENVIRONS OF TIMBOUCTOU. III.

IGUÎLA TADEMEKKET
TIMBOUCTOU
Kabara
Chouf Timbouctou
Hachaouah
Erridma
Kadji
Foréts
Attile et Meguil
Mégérané
RAS EL MÂ
Arabes Tournos et Ouasra
(Lenz 1880)
Ras el Mâ
Bir el Arnab
DILEB
Bir Tuil
Mt Mizinan
Camps Touareg
Tissaïnané
Goundam
Tounansala
Fatakara
Mt Ouón
Mt Terezit
Tadoudgou
Kouretago
(Abatou de Caillié)
Sanyaré
I. Cora
Gakoura
Haaïtaga
Foutika
Iregenaten
Touareg Tademekket
Oulosa
I. Cabara
I. Bangagoungou
ARIBINDA
TOUAREG
KALGOLSH
Miodougou
Katawal
Bougou
Bougouberou
Dougouradié
Safay
Tamarins
Bonay
Oubibi
(Coulz. Songhuis. Touareg)
et
Karta Molet
Darakaina ou Sankoura
Koito
Guridjige
Falta
BODDOU
Sonfi
SONFA
Tomozo
Mare (eau en hivernage)
Boundouré
Séda
Gassi Garma
Diarto
Lac de Karabatanda
Léré
Gardio
Saré Bala
Saukourlay
Tour Daraséré
Barado
Gassi Lakala
Mayo
Baghinto
Lac Debo
Ourandia
OURANDIA
Ganddama
Limite des inondations en hivernage
Diabal
Sogoni
Koulima
Fotopolo
Teleasana
Yalalani
Sambayo
Tenenkou
Togoro Koumbé
Kamaka Sebé
Kana
Kamaka Dehéré
Niasso
Koumbé
Soroma
Wagnuka
Sabaré
Kona
Boukery
BOURGOU
Ganié Corba
Karamena
Kouna
Niakongo
Nimitongo
Mopti
Moumi
Tomona
Douna
Piko
Ouroferlo
Sankama
Tougouni
Soago
Hadi Modi (Foulbé)
MACINA
Bandiagara
Dallol Mondoro
Dallol Bosso
Dallol Fatima
Dallol Bosso
Dallol Fatima
Dallol Bosso
Dallol Fatima

Nine officers and two European sergeants are missing, as well as an interpreter; 1 sergeant, 6 corporals, and 61 native tirailleurs. I have taken in hand immediately all dispositions for defence; there is nothing to be feared, with constant watching, especially by night.

I have at my disposal 600 rifles and 6 guns.

I await the column of Commandant Joffre, to whom I have sent a messenger to give him information and to put him on his guard.

I calculate that he will arrive before his passage [*sic*][1] to Gotedam, or at some five days from Timbuctou.

I have received to-day the mail brought by Lieutenants Dulaurens and Noël.

In consequence of the new situation, I have judged it best to keep the officers, who brought the despatches, to fill the vacancies until the arrival of Joffre's column.

I have communicated with the commandant of the flotilla and requested him to retard his departure until the same date. I possess supplies until the arrival of the convoy, which was reported as about to leave Ségou on the 10th January last.

The mixed population is on good terms with us; it promises us its absolute support, and wishes us to remain here.

The sedentary population is desirous for peace and tranquility for commerce; but it is not accustomed to furnish guides and porters: the chiefs of the villages are without authority: there is even a great difficulty in procuring guides, on account of the terror caused by the Touaregs.

Numerous envoys from the villages of different regions, some at a distance, have come here to give in their submission to-day.

The commerce of the place is *nil*, on account of the want of security for the caravans. The merchandise failing, the regions of Diaréfaré, Mopti, Bandiagara, Djenné, no longer furnish any grain, millet, groundnuts, or rice.

Since our arrival many caravans have sent to enquire, by the merchants established here, whether they can come in security. I have replied in the affirmative.

At the request of the chiefs and notables, I have written to the Commandant of Ségou, to invite the inhabitants of the regions, above mentioned, to send eight lighters of grain, the caravans beginning to return. The climate is good at this season. Accommodation is wanted. It will be necessary to build. The sanitary state of the column is good, in spite of the extreme fatigue.' "

[It is proposed to deal with the relief of Timbuctou by Colonel Joffre's column in a subsequent paper.—*S.P.O.*]

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[1] This seems to refer to Joffre being met by the messenger at the crossing of the Oulou-Oulou River at *Gonian* (?).

THE ADJUTANCY OF A MILITIA ARTILLERY UNIT.

BY

AN ADJUTANT.

COMMUNICATED BY

THE SECRETARY.

Militia Artillery Unit.

A Militia Artillery Unit may be best described by giving in detail its *personnel*, taking as a standard the unit with which the writer is familiar. Its establishment of officers consists of:—1 Lieut.-Col.; 1 Major; 6 Captains; 9 Subalterns; 1 Adjutant; 1 Quartermaster; 1 Medical Officer. Of these the Adjutant, Quartermaster and Medical Officer are Army Officers attached to the Militia for the following periods:—The Adjutant for five years, the Quartermaster for an indefinite period, and the Medical Officer for the period of the training.

The Adjutant is to understand that he will not, unless under very exceptional circumstances, be allowed to resign his Adjutancy with a view to returning to his regiment, even if it is ordered on active service, before the end of the five years for which he is appointed; if not a substantive field officer he will rank regimentally for precedence and military command, among the Captains of the Militia unit, according to the date of his commission as Captain in the Regular Forces. Para. 55, Militia Regulations, 1893.

Permanent Staff.

The N.-C.O.'s and men consist of two classes, viz.: Permanent Staff and Militia. The Permanent Staff are N.-C.O.'s and men on their Army engagements, appointed to the Militia at their own request, and generally for the remainder of their service; it consists of: 1 Regimental Sergt.-Major, 1 Quartermaster-Sergeant, 1 Sergeant Instructor-in-Gunnery, 1 Sergeant Trumpeter, 6 Company Sergeant-Majors, 6 Sergeants, 6 Trumpeters. These, together with the Adjutant and Quartermaster, are on duty permanently, reside in quarters or in lodgings, at the head-quarters of the unit, and are practically the nucleus of the unit.

Militia N.-C.O.'s and Men.

The establishment of Militia N.-C.O.'s and men, exclusive of the Permanent Staff, are 540 in number, *i.e.*, 90 per company; the number of

companies being six; these, like the officers, are only on duty during the period of the Annual Training.

The Company.

The Company, all told, consists of: 1 Captain; 1 or 2 Subalterns (3 Companies having 2 Subalterns and the remaining 3 only 1); 1 Company Sergeant-Major, 1 Sergeant, 1 Trumpeter—Permanent Staff; 2 Sergeants, 4 Corporals, 2 Bombardiers, 2 Acting Bombardiers and 80 men—Militia.

Instructor-in-Gunnery.

One of the officers, either a Captain or Subaltern, in this case a Captain, is appointed Instructor-in-Gunnery to the unit, with additional pay at the rate of 2s. 6d. a day during the training, and holds the appointment until he obtains field rank. This officer, although nominally one of the six Captains of Companies, is strictly enjoined to occupy himself solely in instructional duties, and thus one Company is without a Captain, and is commanded by a Subaltern, who, in his turn, expects to be struck off the Subalterns duty roster, and thus creates a grievance by diminishing the number of Subalterns for duty.

Para. 235 Militia Regulations, 1893.

It may here be remarked that the period for which the appointment is held constitutes another grievance. An officer, to qualify for this appointment, attends a three months' course of instruction at Woolwich, and if he passes a satisfactory examination, is eligible for the appointment; but, if a subaltern is appointed and holds it till he reaches field rank, and if promotion be slow, the chance of any other officer getting it is remote.

Both these grievances could be remedied, the first, by the officer doing his company as well as his instructional duties; the second, by the appointment being held for a limited period, say five years.

Lieut.-Colonel Commanding Militia Artillery of the District.

The immediate superior to the Officer Commanding the unit is the Lieutenant-Colonel Commanding Militia and Volunteer Artillery of the District, to whom all the correspondence initiated by the unit goes, and whose head-quarters may be at the head-quarters of the unit, or, as in this case, 100 miles off; this officer is the Inspecting Officer, and annually inspects the unit during the training, taking two days for it.

The Militia Year.

According to the Militia Regulations, a work which appears in a new edition as frequently as most army books, the year is divided into three periods, viz.: Preliminary Drill, Training and Non-Training Periods.

The Preliminary Drill lasts 63 days; the Training 27 or 34 days, according as the unit trains at its head-quarters, or at a place which entails a sea voyage from and to its head-quarters; in either case the unit assembles and disbands at its head-quarters. The Non-Training Period comprises the rest of the year.

The Training takes place any time between 1st May and 30th September, these dates being the earliest and latest on which troops at home are permitted to be under canvas without special authority.

The date fixed for the commencement of the Training fixes the date for the commencement of Preliminary Drill; thus, if the Training is to commence 1st May, the Preliminary Drill would commence 27th February, 63 days immediately previous to the Training.

Recruits.

All recruits raised for the unit since last training, and who did not elect to drill on enlistment, come out for Preliminary Drill, together with a certain number of trained men—not exceeding 25 per cent. of the recruits assembled—for guards, and to act as cooks, &c. Para. 214 Militia Regulations, 1893.

The Adjutant of the unit is Recruiting Officer of the county to which the unit belongs; the N.-C.O.'s of the Permanent Staff being employed under him as recruiters. Recruits for the Militia may be enlisted between the ages of 18 to 35, for a period of six years, for service in Great Britain and Ireland; on completion of which they can re-engage for a period of four years, and can re-engage every four years up to the age of 45, receiving on each occasion a bounty of thirty shillings.

On attestation, recruits have the option of drilling on enlistment or not; if they elect the former they are at once clothed, and dispatched to what is practically the depôt for the recruits of the district—in this case, the head-quarters of the Lieut.-Colonel Commanding Militia Artillery of the District—for 49 days recruit's drill; if the latter, after attestation, they proceed to their homes and attend the Preliminary Drill of the unit, having left their address, to which is sent, a month before the commencement of the Preliminary Drill, Army Form E531, called "Notice to Militiamen," informing them of the day and hour at which they are to attend at the head-quarters of the unit for Preliminary Drill.

The Unit Buds.

On attestation recruits are posted to companies, and on assembling for Preliminary Drill are medically inspected and clothed; then drilled by the N.-C.O.'s of their company for five hours a day, viz.: 6.45 a.m. to 7.45 a.m., 9.45 a.m. to 11.45 a.m., and 1.45 p.m. to 3.45 p.m.

Assuming the Preliminary Drill to have commenced on the 27th February, on the 3rd April, 28 days before the Training, a certain proportion of N.-C.O.'s of the unit, who are desirous of doing so, join, and also re-enlisted men and transfers.

Re-enlisted Men.

Re-enlisted men are those who, having served 12 years in the army (6 in the Army and 6 in the Reserve), and having been discharged therefrom with a good character, and being less than 35 years of age, enlist into the Militia within three years of the completion of their Reserve service; Men of this class, who enlist into the Militia after more than three years have elapsed since the completion of their Reserve service, join as recruits; thus there are in the unit a considerable number of old soldiers, whose value can hardly be over-estimated.

Transfers.

Transfers are men transferred from infantry units on the ground that

they have taken up their residence in the county to which the unit belongs.

Gunnery Instruction.

On the 17th April, 14 days before the Training, the recruits who elected to drill on enlistment, and who have already done 49 days recruits drill, join for instruction in gunnery, under the Instructor-of-Gunnery, who also joins for duty at this stage.

During the period of Preliminary Drill, the recruits have been accommodated in lodgings; their ration of bread and meat has been issued to them daily; vegetables, groceries, tea, &c., being supplied to them under arrangements made with the person supplying the lodgings.

The unit is to assemble on May 1st, and will be encamped; during the last week of Preliminary Drill the camp equipment, which has previously been requisitioned for, arrives; also all arrangements necessary for the supply of a large number of men have been completed in every detail.

On the 28th April the camp, as required during the Training, is pitched, and beds filled; on the morning of the 29th April, the recruits vacate their lodgings and march into camp and occupy it, special authority to do so having previously been obtained, because it is not yet the 1st of May.

It is an understood thing that no application from a Militia unit to go under canvas before the 1st of May will be entertained.

The Assembly.

Early on the 1st of May the equipment and clothing of each company are brought from the store and placed in the company lines. Notices having been issued a month previously, the men of the unit now come in; it may here be mentioned that the fact of a notice having been posted to the address left by a militiaman is sufficient evidence to convict him in the event of his absence without leave.

Each man, as he enters the camp, repairs to his company lines and reports himself to his Company Sergeant-Major, from whom he receives a card with the number of his company, and his own number and name on it; he then proceeds to the hospital tent and is medically examined; the Medical Officer entering on his card "fit," "temporarily unfit," or "permanently unfit," as the case may be; he then returns to his Company Sergeant-Major with his card, who, if the man is fit, issues to him his valise equipment and clothing; the man then puts on his uniform and puts his plain clothes in a plain clothes bag, which he leaves in his tent; he then receives from his Company Sergeant-Major, if he wishes it, a ticket entitling him to a hot meal, with which he proceeds to the cook-bank, and on handing his ticket to the master cook, receives a hot meal which is debited to his account.

Men found temporarily or permanently unfit are not clothed, but are settled up with and return to their homes.

As soon as the majority of the men are in, each company parades with its plain clothes bags, which are taken and placed in the store; the arms, consisting of a Martini-Henry carbine and the sword-bayonet with steel scabbard, which used to accompany the Snider carbine, are

issued; finally, the men are paid their day's pay, or rather one shilling of it.

The pay of a gunner is 1s. 2d. a day, and throughout the Training the men are paid daily 6d. each, 4½d. a day being charged for groceries and washing, and the balance is retained, and paid to them at the end of the training.

The Unit Blossoms.

The hours for drill during Training are the same as during Preliminary Drill; the early morning parade is devoted to setting-up drill, and infantry drill in company and in battalion; the remainder of the day to gun drill and Artillery exercises.

The number of guns available for gun drill, when the unit trains at head-quarters, is 14, and two for elementary; also two gyns and a certain proportion of artillery stores; this, of course, is a totally inadequate supply for so large a number of men; on the other hand, supposing the supply of *matériel* to be so increased that there would be sufficient for the whole unit to be instructed simultaneously in gun drill and Artillery exercises, as occurs when the unit is trained away from its head-quarters, there would then be a dearth of instructors, as some of the Militia N.-C.O.'s are but poor instructors. The difference in rank between the Militia N.-C.O. and man is not so marked as in the Regulars, and a man is seldom charged with an offence, except by a Permanent Staff N.-C.O.; the amount of work this entails on the Permanent Staff, can be better imagined than described; even some of these are not as strict as they should be.

The gun drill is carried on with 18-prs. and 32-prs. S.B., as if they were 64-prs.; there are two 64-prs. on charge for practice, and as these two guns have to fire a large number of rounds, and have to be examined also, the practice should commence early, say, not later than the beginning of the second week of the Training; on one occasion both these guns, on examination, were condemned, and the practice was necessarily suspended until the arrival of fresh guns which, *mirabile dictu*, happened in time to complete the practice before the end of the Training.

The number of rounds allowed per company is 90, 45 of these being blank, and the remainder service with a sea range; when the unit trains away from head-quarters these 90 rounds per company are commuted into a lesser number of rounds of a heavier nature than the 64-pr.

During the second week of the Training the first inspection of the unit usually takes place, viz., that of the General Officer Commanding the District; and on the Saturday of this week the Regimental Sports usually take place: every provision is made for the recreation of the men in their spare hours, by means of cricket, quoits, &c., the canteen and coffee shop being liberally supplied with papers and games.

The officers during the Training lay themselves out to hospitably entertain their friends and acquaintances by means of guest nights, band promenades, and a dance, the latter usually taking place the night before the Regimental Sports.

The Annual Inspection generally takes place on the Wednesday and Thursday of the fourth and last week of the training; the programme for it is pretty much as follows :—

First day—morning.—Marching order parade, inspection of arms, kits and great coats, New Reserve, *i.e.*, men enlisted for the Militia Reserve during the current Training, and the camp during the dinner hour. In the afternoon, gun drill and Artillery exercises and books.

Second day—morning.—Drill order parade for infantry drill, and practice from 64-prs., which concludes the inspection.

Militia Reserve.

One-third the number of the establishment of gunners in the unit may be attested for the Militia Reserve, which renders them liable to serve abroad, in addition to their ordinary liabilities as militiamen; they must be between the ages of 19 and 34 years, have served two Trainings, and be of good character; they receive a bounty of £1, called a "Reserve Bounty," in addition to their £1 bounty as Militiamen; the engagement for the Reserve runs concurrently with the Militia engagement, but a man cannot be enlisted for the Reserve after 34 years of age.

The Unit Fades.

The inspection concluded, the unit which we have seen bud and blossom, now begins to fade; the last process being as rapid as in the case of a flower nipped by frost.

On the Friday the arms are taken in, oiled, and packed in arm chests, ready for transmission to Ordnance Store; the clothing and kits of the men having been inspected, and any deficiencies or damages noted and charged to the individuals concerned, are placed in store; the tent bottoms are scrubbed and cleaned, and placed in wagons on the railway line, which in this case is in close proximity to the camping ground; the men then sign their accounts; their credits and bounties, and any money prizes they may have won at the sports, are placed in envelopes and sealed in their presence, but not given to them until they have taken their seats in the train on the following day.

The Bounty Board.

On this day also assembles the Bounty Board, which has power to deduct from a man any portion of his bounty, for misconduct during training, or to pay for clothing and necessaries lost or destroyed, or for barrack damages, or for repair of arms; sentencing a man to appear before a Bounty Board has a most salutary effect, because there is nothing a Militiaman hates more than having any portion of his bounty stopped from him.

The Disbandment.

On the Saturday morning, the last day of the Training, the camp is struck and packed in wagons on the railway line, and the men change into plain clothes; all men who belong to the immediate neighbourhood are kept in uniform, and not settled up with until all the others have gone. The men having got into plain clothes are then marched by companies to the railway station, and when entrained, receive the en-

velopes containing the money due to them; their railway fares being paid to the limits of the county to which the unit belongs.

The Non-Training Period.

With the disbandment of the unit commences the third period of the Militia year, technically known as the "Non-Training Period." For the first two months the N.-C.O.'s and trumpeters of the Permanent Staff are occupied in cleaning, brushing and folding the clothing of the Militiamen; during the whole of this period the Permanent Staff parade daily at 10 a.m., and are inspected at least twice a week by the Adjutant; and during the last month of this period, immediately before the Preliminary Drill, the Permanent Staff are put through a course of re-drilling under the Adjutant. Para. 372 Militia Regulations, 1893.

A building, formerly an hotel, which is contiguous to the camping ground, and which belongs to or is leased by the Government, has been converted into a barracks, and is the head-quarters of the unit; the ground floor contains an orderly room, guard room, prisoners' room and one cell, Commanding Officer's office, Officers' Mess and ante-rooms and Officers' Mess kitchen. On the first floor are married quarters for the Regimental Sergeant-Major and Sergeant Instructor-in-Gunnery, the Quartermaster's office and stores, and store for the clothing and equipment of companies, which is in charge of the Company Sergeant-Majors, under the Quartermaster.

Adjutant's Pay and Allowances.

The pay of an Adjutant, if a Captain, is 16s. a day and the allowances as follows:—

Extra duty pay as Recruiting Officer ...	2s. 6d. a day
Lodging allowance	2s. 3d. „
Fuel and light allowance... ...	...3d. or 6d. „
Servant's allowance	1s. 0d. „
Forage for one horse	1s. 7d. „
Stabling „ „	9d. „

Messing allowance, 4s. 0d. a day during Preliminary Drill and Training, and tentage 3s. 0d. a day when under canvas. The pay of an Adjutant, if a Subaltern, is 12s. 6d. a day, and allowances the same as those of a Captain.

The foregoing particulars, it must be remembered, refer exclusively to the unit with which the writer is familiar at the time of writing;[1] variations occur, for instance, a unit with less than five companies is not entitled to the services of a Quartermaster, whose duties have then to be performed by the Adjutant; again, all Adjutants are not paid Recruiting Officers. The qualifications necessary for appointment to an Adjutancy of Militia are given in "R.A. Standing Orders, 1893," and the names of Adjutants, with the dates of their appointment and the stations at which they are quartered, are given in the Regimental List issued monthly from R.A. Institution.

[1] *January, 1894.*

THE NECESSITY FOR A FIRING TEST TO PROVE PRELIMINARY TRAINING COMPLETE.

BY

MAJOR O. S. SMYTH, D.S.O., R.A.

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1. Every Artillery officer should look forward to the time when his corps can prove that they are masters of their weapons, and this will be when Practice Reports of all batteries note good results throughout.

2. The great improvements of late years have been due to "Instructions," which, after analysis of all Practice Reports, are issued yearly, and point out common errors; but this is not enough, if it is not clearly shown how an error is to be eliminated, it is likely to remain.

3. Para. 4 of "Instructions 1893"[1] has appeared in its present form in all "Instructions" yet issued, and points out the first error:—Batteries do not complete their Preliminary Training so that a small amount of Elementary Practice will put a finishing touch to it.

4. To eliminate the error it seems necessary to know:—

i. Can some standard of efficiency of complete Preliminary Training be laid down?

ii. Can this standard be satisfactorily tested?

iii. Having laid down a standard, and tested it satisfactorily, how will Elementary Practice put a finishing touch, and what is it?

5. A statement of the object of practice, and of how it is attained, will best give the knowledge required.

The object of all practice is to obtain good results. These are obtained when the fire of the six guns of a battery is so directed that all projectiles will fuze or burst—according to the nature of fuze used—at a selected point, or so near it as to be effective. To attain this object, three essentials must be ensured.

Let it be emphasized that, in the order of their importance, in the order in which they are exercised, and in the order in which they must be ensured to obtain good results, they are:—

1st. Accuracy of graze and burst of a battery.

2nd. Correct observation.

3rd. Proper correction of errors.

[1] In India.

6. A standard can now be laid down, and it is the first essential.

7. It can be tested by itself without exercising the other two.

Bring the guns into action on any ordinary range, select some well defined aiming point, which need have no reference to the grazing and bursting points.

Fire six rounds of percussion shell, one from each gun, all laid alike.

Let a range party note accurately the rectangle within which these graze.

Similarly, fire six rounds of time shell, with one length of fuze, to ensure a burst in the air, and let the rectangle of these bursts be also accurately noted.

8. The battery has now found its rectangles of graze and burst.

If these are efficient, *i.e.*, would produce as good results, as if grazes and bursts respectively, coincided, the battery passes the test, the first essential is ensured, and it is fit to proceed at once to Elementary Practice.

9. Having laid down a standard and tested it satisfactorily, the statement in para. 5 shows how Elementary Practice will put a finishing touch, and what it is.

For when the first essential is ensured, the second will determine position of grazes or bursts, short of, or over, a selected point; the third will bring grazes or bursts and point within the efficient rectangle, and this is the finishing touch required, before a battery is fit to proceed to service practice.

10. No amount of rounds will put this finishing touch to the Preliminary Training of a battery, not passing the test, because it is plunged at once into practice involving the exercise, in order, of three essentials, and the first not being ensured, the other two cannot be given fair play; bad results follow, there is a natural tendency to seek excuses, and guns and ammunition frequently get undeserved blame.

As to the necessity for the firing test, the following statements will, I believe, be acknowledged to be true.

i. Many officers and men, of all ranks, in a battery, with every wish to complete Preliminary Training have only a vague idea of the standard they are meant to attain, and so:

ii. When examined by the Camp Commandant, as at present, would not be satisfied with the decision given, if turned back to further Preliminary Training.

iii. Many Camp Commandants are not quite clear as to what constitutes complete Preliminary Training, and so:

iv. When examining, by present tests, unless Preliminary Training has been very incomplete, are not prepared to convince a battery that it is unfit to proceed at once to Elementary Practice.

Obviously all concerned ought to welcome some convincing test.

12. Again, there are three essentials to obtaining good results at prac-

tice, the first must be ensured before the other two can be given fair play, so it must be necessary, if possible, to test this first essential before allowing a battery to proceed to practice involving exercise of the other two; but this first essential is identical with the standard of efficiency of complete Preliminary Training.

It therefore appears doubly necessary to have this firing test.

13. If the necessity is not proved, I would suggest that for one year every battery should expend 12 rounds in finding its rectangles of graze and burst.

A comparison of these rectangles with the results noted throughout in the Practice Report would be instructive.

14. Ammunition, expended in acquiring efficient rectangles, would not be wasted, as results at all practice, when the test was passed, would be immensely improved.

15. Finally, the erroneous idea would be removed, which is apparently sanctioned by all range tables, that only 50 per cent. of rounds can be expected to fall in the efficient rectangle.

Perfect results would be bringing grazes or bursts and a selected point to coincide. This is deemed impossible, and each nature of gun is credited with a known normal error, which should be taken as a guide in calculating the efficient rectangle.

A Plea for Service Targets and Indirect Laying.

1. Everyone will agree with the statement that a country paying troops, has a right to expect that all arms will take the field, when needed, and produce the best possible results under all circumstances.

All training in peace should tend to realize this expectation.

2. The general object of all arms, in war, is one—the defeat of the enemy—but, in bringing this about, each arm has its separate *rôle*, that of the Artillery—with one aspect of which I propose to deal—is rapid accuracy of fire under service conditions.

3. To train properly, in peace, service conditions, where possible, should be introduced.

4. The targets, at all practice, are not what would be met with on service, a fact easily verified on any field day.

No one denies that service targets could be improvised, but the seemingly unanswerable objection against them, always advanced, is:—"What is the use of firing at difficult service targets, until good results can be produced on easy targets?"

This objection has been allowed undue weight in overruling all arguments in favor of service targets, and especially the equally powerful one:—"If our object is to produce good results on service targets, why not expend, in firing at them, as much practice ammunition as possible, of the small amount annually allowed."

5. Once there is a clear grasp of how good results at practice are to be obtained, the seemingly unanswerable objection to service targets vanishes, as it will be seen, that only one man—the observer—need see the target at all.

All good results at practice really depend on three essentials being ensured, in order—

1st. Accuracy of graze and burst of a battery.

2nd. Correct observation.

3rd. Proper correction of errors.

The first can be ensured by complete Preliminary Training, can be tested by itself—position of graze and burst having no reference to the aiming point—indirect laying—and the first being ensured, the second will determine position of graze or burst short of, or over, the point where these ought to be—which none but the observer need see—and the third will bring graze or burst, and point, within the efficient rectangle, *i.e.*, normal error of gun. Once there is a clear grasp of this it will be seen that, the three essentials being ensured, it does not matter what the target is, nor where it is placed, with reference to the aiming point.

6. Instructions lay great stress on layers being exercised with service objects, or aiming points, but once practice commences this laying is shelved, in accordance with the objection to service targets.

Wherever the target is placed, in line with, or near it, if not at the target itself, is sure to be some well defined natural feature, which can be selected as aiming point, and the three essentials being ensured, the layers need only be told to aim at this point, for good results to be produced on the target.

7. Again, good results denote mutual confidence established throughout the battery.

Under present regulations, if this is not established, unless smoke obscures observation of layer, he thinks he can observe position of graze and burst with reference to the target, and human nature will try to assist, possibly on wrong observation. If the exact position of target is not known to layer there can be no temptation to distrust observer's decision; and let it be emphasized that the first essential being ensured, good results can only depend on the observer, and correction of errors, often one and the same individual—the C.O.—who, if he is fit for his position, in correcting errors, gives prompt and clear orders, which are easily obeyed.

8. Inferences seem to be obvious. Devote a few rounds at first to testing first essential; then devote rounds to establishing confidence, by slow firing at service targets, with indirect laying, and then expend all remaining ammunition in attaining the true object of all service practice, rapid accuracy of fire under service conditions.

Finally, let batteries be judged and classified, and prizes awarded, by the results of all battery service practice—para. 34 (iii.) of "Instructions, 1893"—and not as at present, by the results of one day's practice.

SUPPLY OF AMMUNITION IN THE FIELD.

BY

MAJOR E. C. HAWKSHAW, R.A.

The R.A.I. "Proceedings" for November, 1893, contains a most interesting paper, by Major Wynyard, R.A., on the subject of "Supply of Ammunition in the Field," a subject which, under present circumstances, cannot be considered as satisfactory.

Having devoted some months past to this very subject I am now in a position to give all detail in connection with a scheme which, in some points, will coincide with Major Wynyard's ideas. The busy time of year prevented my sending it before.

I have, in my possession now, a portable magazine made to hold four complete rounds of ammunition, *i.e.*, shells, cartridges, tubes and fuzes. In designing it I kept the following points in view:—

(1.) The rounds are to travel altogether in this magazine. Fittings are therefore in it to hold everything steady. Except for use they will not be removed.

(2.) I chose the number of four rounds because a gunner of below average strength can easily pick the magazine up and run with it.

(3.) It can easily be slung on a horse's or mule's back.

(4.) It takes up little room, put it where you like.

(5.) It has straps for slinging as on those at present in use.

Each cartridge must have its own water-proof cover.

The exact size of this magazine in outside measurement is $15\frac{1}{4}'' \times 8\frac{5}{8}'' \times 13\frac{1}{2}''$.

Now, the present two boxes of ammunition on a 12-pr. wagon-body or limber hold 18 rounds each—total 36 rounds.

I propose to substitute for these one large box, like that on the limber of a store wagon, and have simply oblong divisions in it, each made to admit one of the above portable magazines.

The total size of this box to fit where the two boxes on limbers and wagons now are will be, in outside measurement, $4'\ 2''$ long $\times\ 1'\ 10''$ broad. It will admit very nearly $8\frac{1}{2}$ of these magazines and, if made slightly larger, which can be effected with little difficulty, will admit 9, *i.e.*, 36 rounds. Shells must travel upright. If they are laid horizontally such very strong fittings are required to keep them apart that room is taken up and weight added to the carriages. I propose to have these boxes opening to the front on the limbers, and to the rear on

the wagon-bodies—so that the gunners seated on them can pull the magazines out without dismounting.

Now as to the working on service :—

The wagons must not come anywhere near the guns when in action.

At the word "Prepare for action" two of these magazines are to be taken out of the wagon-body or of the gun-limber if the wagon is not near, and fastened to the *gun-carriage*, not the limber. Two more are to be placed on the foot-board of the gun-limber.

The battery now goes into action. Each limber can at once go away and each gun is left with 16 rounds of ammunition. The limbers halt under cover some 400 yards off, or nearer if there is good cover available. Directly they are halted the officer or N.-C.O. in charge of the wagons sends up four more full portable magazines for each limber if the ammunition in use has been taken from them. These can be sent up slung over the backs of spare horses, or unhooked lead or centre horses. When the gun-limbers are full, should the battery require more ammunition, the wagon horses can carry more up, or the spare gunners can carry the magazines.

In this way all exposure is reduced to a minimum, and the labour compared to the system in vogue is one quarter if not less. I shall be happy to produce my magazine if requested. It will carry shells fuzed or not. If the guns go on to a second position, the limbers are now full, and the empty magazines can either be taken on, fastened on at the backs of the limbers, or left for the wagons to pick up during the advance.

Wagons with a battery in action are a terrible encumberance. They add to the enemy's target and, when reversed in rear of a section, are straight in front of the guns in the event of a flank being thrown back to repel a charge. Doubtless many brother officers will find defects in my propositions above, but I feel sure that it is a step in the right direction.

SAUGOR, C.P.—A STORY OF 1857.

BY

LIEUT.-GENERAL T. NICHOLL, R.A.

In the beginning of 1857 certain indications of a feeling of unrest were making themselves evident in the Bengal Presidency, followed by acts of insubordination and mutiny, notably among the regiments of Native Infantry stationed at Berhampore and Barrackpore, and subsequently by the outbreak at Meerut, and later on at short intervals at other stations. It was about this time, the early part of February 1857, that my wife and I, being bound for Saugor, Central India, heard that the 14th Bengal Irregular Cavalry would shortly be passing through Agra, where we were then stationed, en route to Jhansi, and we determined to join them for the sake of company. There were two very nice fellows with the regiment, Captain Tyrwhitt, Commanding, and a doctor whose name has escaped my memory.

During some of the marches I occasionally noticed acts on the part of the sowars (Native cavalry soldiers) of apparent studied rudeness, so uncommon generally on the part of Native soldiers towards European officers and gentlemen. I mentioned them at the time to my wife, but did not wish to create any unpleasantness by making complaints to the Commanding Officer of the regiment, especially as the journey from Agra to Jhansi would not probably occupy more than a fortnight. This regiment, together with a wing of the 12th Regiment Bengal Native Infantry stationed at Jhansi, mutinied the latter end of May or beginning of June 1857, and it is believed that only one single European, an Overseer of the Public Works Department, escaped from the station, the remainder, whether man, woman or child, being shamefully massacred. We were precious glad to drop the 14th Bengal Irregular Cavalry at Jhansi, and proceeded to our destination in company of the 3rd Bengal Irregular Cavalry, which was bound for Saugor in course of relief. This regiment was a much better behaved body of men than those of the regiment left behind at Jhansi. It is not improbable that the 14th Regiment Bengal Irregular Cavalry had become tainted with sedition and mutiny at Delhi, or some other station in the north-west, whence they had come. We arrived at Saugor in the beginning of March 1857, and were hospitably entertained by Captain and Mrs. W. B. Marshall. He was then commanding the Bullock Battery of Artillery, the fighting portion of which consisted of the only European soldiers, probably about 90 strong, stationed at Saugor, the remaining establishment of the battery being composed of bullock drivers and about 27 gun lascars, whose principal duties con-

sisted in affording a guard over the guns by day, over the bullock lines by night, and furnishing one or two orderlies. We managed shortly to find a vacant house, picked up some furniture to supplement what we had brought with us from Agra, and settled down. A few weeks later another house in a better situation falling vacant we transferred ourselves into it, and while occupying it received news of the serious outbreak at Meerut on the 10th May, followed in almost rapid successions by outbreaks and disarmaments of Native troops at other stations in Bengal and the north-west of India. During portions of May and June 1857 we could not help noticing frequent fires on the hills surrounding the valley of Saugor, in which the town, fort and cantonments stood, also occasional discharges of rockets. We could not at the time make out whether the fires were signals lighted by natives, or accidental, caused by the friction of dry jungle on the hills, a common occurrence as we were subsequently informed: but the discharges of rockets was never explained. The reports of outbreaks at other stations naturally made us all more or less anxious, not knowing when our turn might come. I used to leave my house daily to proceed to the magazine in fear and trembling, lest a mutiny might break out in my absence and my wife be polished off without my being near to help her. We then had in our employ a faithful Chuprassie (messenger), by name Rehmān Khan, who had been in General J. T. Boileau's (my wife's uncle) service for 12 years previously, and I made my wife over to his care each day, he faithfully promising that no one should touch her except over his dead body. He died in our service in 1869 at Ghazeepore while proceeding to his home for the benefit of his health, and was buried under the orders of my brother-in-law, who was then Magistrate and Collector at that station. The Officer Commanding the Saugor District, Brigadier W. Sage, unfortunately a cripple on both legs, possessed a cool intelligent head on his shoulders, and from time to time issued orders to the troops to the effect of a force being prepared to march out to act in imaginary disturbed districts, thus trying to instil into the minds of the native soldiers ideas, other than brooding over the reports of mutinies at other stations, and at the same time endeavouring to put the best face on matters, without in any way appearing to distrust the native troops. A Queen's birthday ball was got up for the 24th May, and the majority of the European officers and their wives attended it, ourselves among the number; but it was an anxious time, owing to the greater portion of the European community being gathered under one roof, and as it turned out, we were very near our last squeak, for it subsequently transpired that a body of Sepoys had actually assembled to proceed to the Mess-House of the 42nd Regiment Native Infantry, where the ball was being held, to polish us off; but some wonderful merciful Providence caused them to give up the idea at the last moment, so another lease of life was granted us. About this time, or possibly the beginning of June, an urgent demand came from Major Sale, commanding a wing of a regiment of Scindiah's Gwalior Contingent of Native Infantry stationed at Lullutpore, about 60 miles from Saugor and half-way to Jhansi, asking Brigadier Sage for a couple of guns, as with their aid he was sure he could hold on at

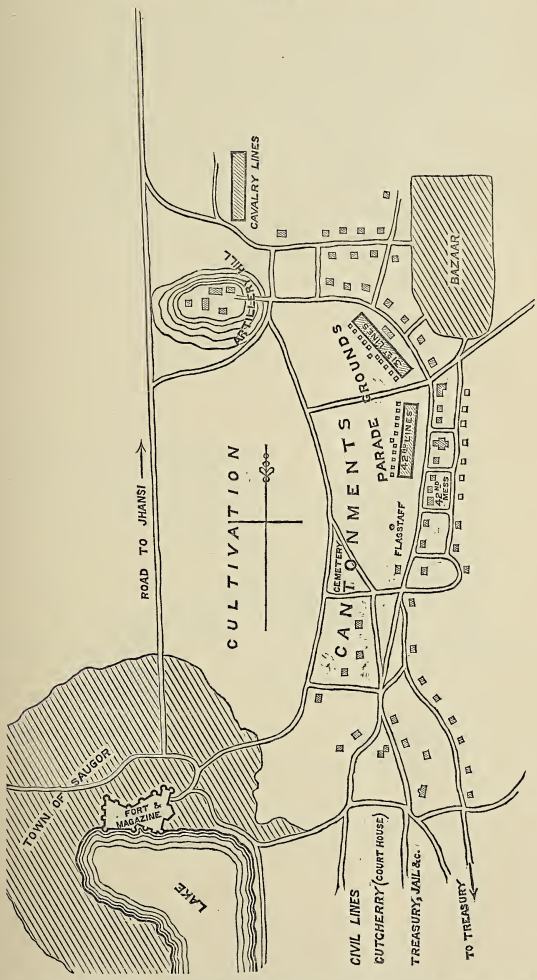
Lullutpore and keep the surrounding country quiet. As will be noticed hereafter, the guns never reached Lullutpore, and Major Sale, together with Captain and Mrs. Irwin and children, and Dr. O'Brian, the only European residents at Lullutpore, had to bolt either to Shahgurh or Banpore (two small Native States adjoining), and some weeks later were escorted into Saugor fort by the Rajah's people. The action taken by Brigadier Sage to help Major Sale was the issue of an order directing one Troop of the 3rd Bengal Irregular Cavalry, one Company of the 31st Bengal Native Light Infantry, and one Company of the 42nd Bengal Native Light Infantry to escort two 9-pr. guns (supplied from the magazine) manned by an European sergeant, one European gunner, and 12 gun lascars to Lullutpore. This detachment was placed under the command of Major Gaussen of the 42nd Bengal Native Infantry, and owing to the paucity of subalterns with the Bullock Battery, Capt. Marshall having but one present for duty, the guns were placed in command of Lieutenant Willoughby (an artillery officer employed in the Survey Department, and brother of the Commissary of Ordnance, who did his best to blow up the Delhi powder magazines before he retired from Delhi on the morning of the 11th May, when the mutinous regiments from Meerut arrived there). The company of the 31st Regiment, on the evening before starting for Lullutpore, were reported to have at first refused to take balled cartridge from their own regimental magazine, but eventually did so. This was the first overt act of mutiny on the part of this regiment, now the 2nd Bengal Light Infantry. The detachment under Major Gaussen having accomplished about half its journey to Lullutpore, that officer heard of the existence of a Native fort at Balabet, a little distance off the main road, occupied by some rebels of Bundelcund, generally designated Bundeelas. As he did not wish to leave a fort occupied by an enemy in his rear to interfere with his communications with Saugor, he determined to attack it, and did so successfully. Lieutenant Willoughby was thereupon ordered to destroy the Gate. Unfortunately, he was not in possession of suitable means, such as a piece of proper fuze, so he substituted a piece of his wadded jacket on the spur of the moment and applied a light to it; but the fire ran along it too rapidly to allow of Lieutenant Willoughby getting to a safe distance before the fire reached the powder bag and caused an explosion. Lieutenant Willoughby was knocked down and seriously injured one of his knees, which prevented him doing further duty for months. At the same time that Lieutenant Willoughby was injured, Lieutenant Spens of the 31st Bengal Native Infantry was killed by the explosion, he having, unknown to others, remained behind in the fort, and must have been coming out of it, in ignorance of the orders conveyed to Lieutenant Willoughby, when the explosion took place, for Lieutenant Willoughby said that poor Spens was shot past him and was picked up dead. The next act in this business is curious. When the fort was captured two or three Bundeelas were taken prisoners and brought into camp. Either the same evening or next morning Major Gaussen was arranging for their despatch to Saugor to be dealt with by the civil or military authorities there; but the report then current was that the Sepoys of the 31st Bengal Native Infantry detachment

said they would not allow the prisoners to be thus dealt with, and set them at liberty. It was at the same time reported that the men of the same regiment had deprived the European sergeant and gunner and gun lascars of their swords and placed a guard over them. On receiving this report Brigadier Sage sent instructions for Major Gaussen's detachment to at once return to Saugor, and ordered another detachment out from Saugor to meet it at a certain fordable stream, and there and then to receive over charge of Major Gaussen's two guns and bring them into Saugor, which was duly effected. It was subsequently reported that some men of this second detachment, possibly some Sepoys of the 31st Regiment Native Infantry, spread a rumour that Brigadier Sage intended blowing away from guns all the men of the 42nd Regiment Native Infantry of Major Gaussen's detachment on their return to Saugor, and this false report had such an effect on the men in question that by next morning all of them had disappeared, leaving their arms and accoutrements behind. This appears most extraordinary, for the 42nd Native Infantry detachment with Major Gaussen was said to have behaved quite well. However, the minds of the natives of India were so disordered at the time that the most impossible and extravagant rumours were implicitly believed, such as the Government having caused all the flour in the country to be adulterated with bone-dust, and all ghee (clarified butter) to be mixed with cow's fat (cows being held sacred by Hindoos) with the view of destroying their caste and converting them into Christians. One day I had a talk on the matter with a Jemadar (Native officer) of the 42nd Regiment Native Infantry on guard duty at the fort, and he ridiculed the whole thing and said he was not such a fool as to desert the Government and forego all the benefits of further service and pension, yet this man went off with his regiment when they mutinied later on. I may be wrong, but I presume that the state of affairs near Balabet existing in Major Gaussen's detachment, or some other reports received by the Brigadier, led him to hold a Council of War, apparently on the 21st June, 1857; for on the 22nd idem. he sent for me and ordered me, in consequence of the decision of the said Council, to at once despatch to the Artillery Hill (*see* Plan A.) 100 muskets and 200 rounds of balled ammunition per musket; also, 100 extra rounds per gun for Captain Marshall's battery. The Council of War referred to was composed of the Brigadier, the Deputy-Commissioner (Chief Civil Officer of the District), the Commanding Officers of Regiments and of the Artillery. As soon as I received the Brigadier's orders just mentioned I galloped off to the magazine to have them carried out, and as soon as completed I hurried back to report the same to the Brigadier. When giving me orders for the despatch of the ammunition and muskets to the Artillery Hill the Brigadier had informed me that the decision of the Council of War was that in the event of an outbreak all officers and other European residents were to at once retire to the Artillery Hill where the European battery, the only European soldiers in the place, were located. During the interval of my receiving orders to send arms and ammunition there and returning to report the execution of the same, I had arrived at the conclusion that the decision of

the Council of War was altogether suicidal; for to wait for an outbreak, which was a certainty at some unknown time when we might least

SAUGOR IN 1857 (FROM MEMORY).

PLAN A.

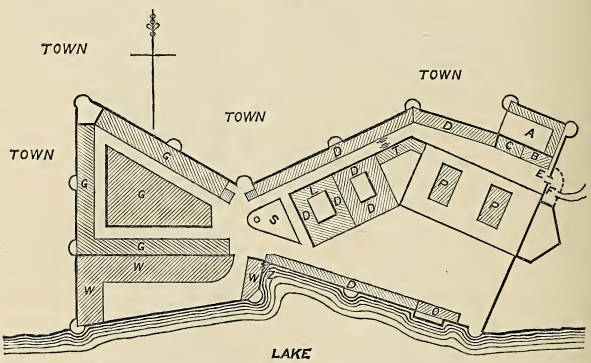


expect it, and then for officers and others with their wives and children to run the gauntlet through bodies of mutinous armed native soldiers,

would be simply courting death and disaster; moreover, the Artillery Hill, beyond the fact of the artillery being located thereon, did not possess one single advantage to recommend it; therefore, after making my report I inquired of the Brigadier whether I might be permitted to ask a question. The request was granted, and thereupon I inquired if it was the Brigadier's intention to abandon the fort wherein was the magazine (Arsenal) containing both siege and field guns, some thousands of stands of arms, and large quantities of ammunition and other war *matériel*. Brigadier Sage replied—"It is impossible to hold two places," that is, the Artillery Hill, as decided by the Council of War, and the fort. I observed that was quite true; but of the two places, the advantages lay entirely with the fort (*see* Plan A.), for therein were stored all our war *matériel*, which, if the mutineers got possession of, would be used against us, that we should never run short of water, as the lake washed one side of the fort, and the fort itself commanded the whole town (*see* Plans B. and A.), therefore we should command

SAUGOR FORT AND MAGAZINE (FROM MEMORY).

PLAN B.



A Timber Yard.
B Guard-Room.
C Magazine Office during Mutiny.
D D Store-Rooms (Armoury, &c.)
E Entrance Gate.
F Outer Gate and Enclosure erected during Mutiny.
G G Gun-Sheds.
L Laboratory.
O Original Magazine Office, converted into quarters for Brigadier, A.-A.-G., Deputy-Commissioner, Commissary of Ordnance, Commissariat Officer, Officer Commanding Bengal Artillery, Officer Commanding 42nd Native Infantry.
P P Powder Magazines.
S Shot and Shell Yard.
T Treasury during Mutiny.
W Magazine Workshops.
Z Water Wicket.

any amount of provisions, and last, not least, we should possess the advantages of a fortified position surrounded by stone walls, and although it was a native structure, except the bastion at the east end, it was better than no fortification at all; whereas the Artillery Hill did

not possess a single one of these advantages: that is, on the Artillery Hill we should have nothing of the necessaries of life, we should have no water and should command nothing, and those who were fortunate enough to reach the place after an outbreak occurred, for the retirement thereto of the European officers and others was only to be effected subsequent thereto, could not possibly hold out beyond two or three days, in the absence of food and water, and surrounded as we should be by nearly 3000 mutineers and any number of bad characters and possibly rebels from the immediate neighbourhood, who would be sure to flock into cantonments for the sake of plunder, &c. The position in cantonments (*see* Plan A.) occupied by the Native Infantry regiments would have enabled them to cut off from the Artillery Hill almost the whole of the European portion of the community who resided in the detached houses scattered about the place. Brigadier Sage at once acknowledged the truth of my argument, and ordered me, in company with Captain (now Major-General) Marshall, to inspect the Artillery Hill on the following morning (23rd June, 1857), and each of us to forward to him a separate confidential report on its defensibility as a military position. Captain Marshall and I accordingly proceeded to the Artillery Hill on the morning in question, and although as a member of the Council of War Captain Marshall was in favour of a retirement to the Artillery Hill in the event of an outbreak, he arrived at the same decision as myself, viz., that the Artillery Hill was at the time, and under then existing circumstances, utterly indefensible as a military position, and we returned to our respective homes. I presume Captain Marshall submitted his report. Mine was at once written and forwarded the same day (23rd June) again pointing out the advantages and disadvantages of either position, that is, of the fort and Artillery Hill, and added that, as the Brigadier was fully aware from the reports of spies, &c. that an outbreak was merely hanging fire, I strongly impressed upon him that it would be the wisest policy to act beforehand and anticipate the intending mutineers by at once occupying the fort. Our situation at Saugor without the fort was simply hopeless, for there was no station with European troops within hundreds of miles, even if they would have been available, so that whatever was to be done to hold the place and to save our lives must be done by ourselves.

I mentioned at the opening of this narrative that I had proceeded to Saugor, and I may say that the object of my journey was in order to take over charge of the magazine (Arsenal) there, from the Madras Ordnance Department, on the transfer of the Saugor District to the Bengal Presidency. The European portion of the Madras Ordnance Department at Saugor consisted of nine warrant and non-commissioned officers, and at the time I am writing off, I had only six Europeans of the same class belonging to the Bengal Ordnance Department, forming in the aggregate 15 Europeans who worked in the magazine daily for eight hours: during the remaining 16 hours the fort and magazine were in the entire charge of a guard of Native Infantry about 30 strong.

On the 24th June, 1857, Brigadier Sage sent for me and personally ordered me into the fort, and also the European warrant and non-

commissioned officers, and with their aid to place the fort into a state of defence by mounting such ordnance on the walls as were most suitable, and to take any other necessary precautions. On the same day the Brigadier issued an order appointing me to the command of the fort and placing the "Madras Ordnance subordinate establishment" under my "immediate orders:" whereupon myself and wife went into the fort and took up our quarters in my office there; and all the warrant and non-commissioned officers of both Ordnance Departments moved in at the same time and obtained quarters in some of the gun-sheds which had to be emptied out for the purpose. As I wished to rid myself of several Native Infantry sentries posted in different parts of the fort, I directed the withdrawal of all, except the one over the entrance gate, giving as my excuse, that as the warrant and non-commissioned officers occupied the further end of the fort, there was no need for sentries about the place. I also ordered two 8-inch howitzers loaded with case shot to be placed every evening by my warrant and non-commissioned officers, for the night, on the road (*see* † † in Plan B.) near the entrance gate, but out of sight of the Native guard. The warrant and non-commissioned officers furnished a guard during the night over these howitzers, and had orders to fire into any unauthorised body of natives approaching them at night. We were all fully employed by day selecting positions and mounting ordnance of the most suitable natures for each position. This was tedious work, for, owing to the terreplein of the curtains not exceeding from two to four feet in width and no ramps existing, it involved the erection of derricks to hoist up both ordnance and their carriages.

At the same time that the Ordnance Department was ordered into the fort, the Brigadier issued a District Order directing the Commissariat Department to provision the fort, which was immediately commenced, and for the Civil authorities to send into the fort all the treasure not required to accompany the force which was to proceed under his command to attack the rebels in the district. No such expedition was intended: it was merely a ruse to allay suspicion and to prevent the Native guard over the Treasury from interfering with the removal of the treasure into the fort. My own opinion was that the Native troops did not much care what we did, for as in other stations where no European troops were quartered, no one exhibited any signs of distrust, officers in many cases sleeping in the Native lines in their respective regiments, they could not help feeling that we were entirely in their hands. They could never have anticipated our acting beforehand with them and turning out of the fort so quietly and unexpectedly the Native guard which were in actual possession. No words can express the thankfulness I felt to an overruling Providence that He put it into my head to speak up and impress on the Brigadier the advisability of our anticipating a mutiny at Saugor, instead of waiting for it to overtake us. What was actually done in the issue of the District Order above noted was to send into the fort all the boxes containing silver coin, leaving in the Civil Treasury only the copper coin, which might subsequently have to be abandoned. Of course, the Sepoys on guard could not know from the outward appear-

ance of the boxes which contained silver and which copper; however, the removal of the silver into the fort was successfully carried out.

On the afternoon of Saturday (27th June) the Brigadier drove into the fort accompanied by his Assistant-Adjutant-General, and Major Pinkney, who was hastening from somewhere south to take up his appointment as Deputy-Commissioner of Jhansi, where his predecessor, together with all the European community except one refugee, had already been massacred. The Brigadier sent for me and desired me to order the Native guard out of the fort and direct them to proceed at once to the Nurreeaolee naka (outlet of the town towards the west), and to replace them by a guard of European gunners, four of whom and a sergeant he had previously ordered into the fort to help clean the guns, the true reason being that they were alarmists and were doing harm in their battery. Some gun lascars had also been ordered in. Thinking that the replacing of the Native guard by Europeans would arouse suspicion and alarm among the guard, I begged to be allowed to relieve the Native Infantry guard by gun lascars. I promised the Brigadier that I would remain at the gate until I got every man of the Native Infantry guard clean out. This request was granted, and then it was for the first and only time during the whole of the seven and a-half months we were confined inside the fort, and previous to entering it, that I felt momentarily at a loss exactly how to act. If the guard moved out quietly at my command well and good; but if there were any hesitation or refusal to obey, what could I do if unarmed? I half felt I ought to take my pistols, then thought if the Sepoys noticed them it might immediately set them off into mutiny, so I went with only a stick and saw every man of the guard out of the fort within half-an-hour or so: the cause of delay was that some of the men had gone off to cantonments to cook and eat their dinners, so I remained posted at the fort gate, together with the gun-lascar sentry, till all the remaining Sepoys as they came in were dressed and accoutred and ordered out to join their guard at the west end of the town. When all had departed I replaced the lascar guard by the four European gunners and a sergeant, and feeling happier went and reported to the Brigadier the execution of his orders. The Brigadier then left the fort in company with the two officers who had come with him; but before leaving he told me that all the ladies, European women, and children had been ordered to come into the fort that evening, and in due course began to arrive, several expecting or, at all events, asking my wife and self for food. As we had only heard an hour or so previously that the ladies and children were to come in that evening, we had not made any provision for them—in fact, we had not given the matter a moment's thought, being fully engaged in making arrangements for their accommodation. However, all the women folk and children were safe inside the fort that night, and that was one more blessing granted to us. One gentleman and his wife, owing apparently to some rumour they had heard that afternoon, hid all their children (five or six of them) under various bushes in their garden, and when it came to time to move into the fort, one of them could not be found for a considerable time. My great difficulty was to allot to each family some sort of accommodation in my

store-rooms, verandahs or gun-sheds, which I had been trying to clear out for their occupation. Of course, the accommodation was very inferior and limited; but as the people had been as it were rescued out of the lion's mouth, they good-naturedly made the best of it.

On Monday morning (29th June) the battery of artillery marched into the fort, coming along the Jhansi road (*see* Plan A.) covered by a small escort of the 3rd Irregular Cavalry, in order to avoid passing the Native Infantry lines. The Brigadier and his Staff, also every European officer of regiments, and the male civil European community came into the fort by 9 a.m.

All the Subadars (Native Infantry Captains) of the 31st and 42nd Regiments had been ordered into the fort to meet the Brigadier that morning, and arrived about 8 a.m. The Brigadier wished to discover if he could possibly arrange with them to have all the bad characters in the two regiments seized and made over to him. After some talking the Subadars made certain promises and were then permitted to return to their lines.

When the battery was about to move into the fort, Captain Marshall also intended to bring in the station gun, which used to be fired (as was the custom) at dawn, noon, and tattoo; but when too late he discovered that the trail was so much injured that it was impossible to move it, so he spiked it and left it behind. The 42nd Regiment Native Infantry subsequently possessed themselves of it, and used it on one occasion, as will be mentioned later on.

When I saw that the Brigadier was a bit settled down, on Wednesday the 1st July, I formally offered to relinquish into his hands the command of the fort, which he had honoured me with just one week previously. He refused my offer, and at the same time told me he would put my name in orders as Deputy-Governor of the fort, and to my astonishment that same day was published the following order, viz.:—"The Brigadier Commanding the District is pleased to appoint Lieutenant Nicholl Deputy-Governor of the Fort, receiving his orders from the Brigadier only; the Captain of the week, Officers of the day, and all guards are placed under the Deputy-Governor, and will receive their orders from him and the Brigadier alone." This order naturally caused some heartburning among my seniors, for they knew nothing of my having been the prime cause of their lives being saved. In their ignorance they simply wondered why a comparatively young subaltern, and one not in Regimental employ, should be selected for such an important and responsible post. However, there I was, and for seven and a-half months I performed the duties in my new position, as well as those connected with the Ordnance Department, without any additional remuneration. Some of them were decidedly disagreeable, including the actual hanging of the Native Postmaster, who had been sentenced to death in consequence of tampering with the mails and aiding the would-be mutineers; also, the hanging of a Brahmin Sepoy of the 42nd Regiment who had made an attempt on the life of Colonel Dalyell, Commanding that Regiment. The further executions were carried out by the Provost-Sergeant under my immediate supervision. The only previous execution I had ever witnessed was that of the

murderer of Colonel Mackeson, the Commissioner of Peshawur, in 1853, when my troop (2/1) of Bengal Horse Artillery, together with the 53rd Foot, 20th Regiment Bengal Native Infantry, and the 15th Bengal Irregular Cavalry formed an escort to prevent the man's rescue should such be attempted by his co-religionists, for his body was subsequently to be burned, in order, according to the Mahomedan idea, to deprive him of all chance of entering Paradise, which is supposed to be realised by killing a "kafir" (unbeliever of Mahomed).

I have already mentioned that on the 29th June Brigadier Sage held a consultation, at which the seizing and delivering up of all the bad characters in the two regiments of Native Infantry was discussed, and the Native officers of each regiment were at liberty to effect the same in any way they pleased, and having promised to do so were dismissed to their lines. However, not a single Sepoy was ever delivered up to the Brigadier. The Subadars were at the same time informed by the Brigadier that when both regiments gave up their bad characters their European officers would be permitted to rejoin their regiments in cantonments, and not otherwise.

A few days after we had all entered the fort advice was brought in that the guard of the 31st Regiment Native Infantry which was posted over the Civil Treasury had removed all the remaining treasure (copper coins) therefrom and were conveying it to their own lines: in doing so they were obliged to pass close by the lines of the 42nd Regiment Native Infantry (*see* Plan A.) While so passing they were intercepted by some men of that regiment, who said the treasure must be taken to their quarter-guard. The men of the 31st Regiment Native Infantry objected, saying as their's was the senior regiment, it should go to their quarter-guard. Some of the 3rd Irregular Cavalry sided with the 42nd Regiment Native Infantry, and, as numbers were on their side, the treasure found its way to their lines. This incident naturally caused a bad feeling between the two regiments, which was further intensified by the following occurrence:—The 31st Regiment Native Infantry had posted sentries over the houses vacated by their European officers, on their proceeding into the fort on the 29th June, to protect their furniture and other property which they had been obliged to leave behind. One day a sowar (a Native Cavalry trooper) entered the compound (enclosure) of Major Finch's house, and was thereupon challenged by the 31st Native Infantry sentry as to his business. The sowar replied that he was going to take some hay (from Major Finch's haystack). The sentry informed him that he could not have it; but the sowar persisting, the sentry said he would shoot him if he touched the haystack, whereupon the sowar up with his carbine and fired at the sentry, but without effect; the sentry in return fired at the sowar and shot him dead. This led to a perfect breach between the 31st Regiment Native Infantry and the 42nd Regiment Native Infantry, with whom the 3rd Irregular Cavalry had fraternised, and it was reported that there was going to be a fight between the two parties, and such a fight, in the shape of a light infantry skirmish actually took place on the parade grounds of the two Infantry Regiments on the 7th July, 1857. We could overlook the parade-grounds from certain parts of

the fort, and saw the skirmishing, as well as the firing of the station gun. I cannot now recollect whether there were any casualties on either side; the whole affair appeared to be rather tame, which at first led people in the fort to fancy that it was all sham. It will be remembered that the 42nd Regiment Native Infantry had taken possession of the station gun on the retirement of the Artillery into the fort, and they subsequently caused some wrought-iron shot to be made in the bazaar, and these they used against the 31st Regiment Native Infantry during the fight. That same evening a deputation from the 31st Regiment Native Infantry waited upon the Brigadier, soliciting a couple of the Artillery guns, with the aid of which they (the 31st Native Infantry) would polish off the 42nd Native Infantry and the 3rd Irregular Cavalry. The Brigadier formed an idea that it was just as likely, after he had given the guns to the 31st Native Infantry, the whole body of native troops would coalesce, and come and attack the fort; he therefore informed the deputation that on the following morning the 31st Regiment Native Infantry should attack the 42nd Native Infantry and 3rd Irregular Cavalry in front, and he himself would take out the whole Battery of Artillery and attack them in rear. In reality he never intended doing anything of the kind, being under the impression that the fight on the afternoon of the 7th July was nothing more than a ruse. However, as it turned out, such was not the case, for the Brigadier's reply to the deputation becoming known to the other party, the 42nd Regiment Native Infantry and the 3rd Irregular Cavalry, with the exception of a few men from each corps who remained faithful, disappeared from the cantonments during the night, leaving the station gun behind, and the 31st Regiment Native Infantry, free of their bad characters, who had joined the 42nd Regiment Native Infantry, remained in cantonments and continued faithful to the last, though at first they appeared to be the worse of the two regiments:—

(1.) In having at first refused to take balled ammunition, when a company was ordered to proceed on detachment to Lullutpore.

(2.) In refusing to allow the prisoners taken at Balabet to be sent into Saugor, and releasing them.

(3.) In putting the European sergeant and gunner, and 12 gun lascars into confinement.

(4.) In removing the treasure from the Civil Treasury.

What course the 31st Regiment Native Infantry would have pursued but for the quarrel between them and the other regiments it is difficult to say. I never heard what route the 42nd Native Infantry and 3rd Irregular Cavalry took on leaving Saugor on the night of the 7th July, but it is quite evident they did not march through Dumoh, 40 miles east of Saugor, otherwise they would probably have prevailed upon, or forced, the two companies of the 42nd Regiment Native Infantry doing duty there and guarding the Government treasure at that Civil Station, to join them. As it turned out the two companies were shut up in Dumoh, being surrounded by rebels from the adjoining

district, who had an eye to appropriating the treasure. As soon as the Brigadier was satisfied that he could trust the 31st Regiment Native Infantry, he sent a detachment composed of a party of that regiment, some of the 3rd Irregular Cavalry who had remained faithful, and possibly two guns, but of this I am not quite certain, to the relief of the Dumoh detachment, and to bring into Saugor the Government treasure therefrom. These two companies of the 42nd Regiment Native Infantry and the faithful few of the other companies formed the nucleus of the present 5th Bengal Native Infantry. The treasure from Dumoh was brought safely into Saugor, and the two companies of the 42nd Regiment Native Infantry marched in and settled down in their regimental lines. After the 42nd Regiment Native Infantry and the 3rd Irregular Cavalry bolted, during the night of the 7th July, a subaltern officer from the fort proceeded every evening to the Brigadier's house in cantonments, where a post had been established to operate against any rebels from the district who might enter cantonments on predatory errands. The result of occupying the fort in anticipation of a mutiny, and the subsequent precautions taken was, that not a single European life was lost, and everything was saved except the copper coin which was left in the Treasury. We were, however, for the sake of greater safety, shut up in the fort from June 1857 till February 1858, when Major-General Sir Hugh Ross marched in with the Central India Field Force, when we all moved into cantonments once more. During the 7½ months of our occupation of the fort, the 31st Regiment Native Infantry, or portions of the regiment, were constantly out (almost daily for some time), to drive off Bundeela rebels, who used to come down from the surrounding hills to lift cattle belonging to the cow-herds and other residents of the Bazar, while out grazing. The Sepoys began to get so sick of it that they frequently enquired from their officers when the European troops were coming. In addition to this harrassing work, Brigadier Sage from time to time sent out detachments composed of Native Infantry, Native Cavalry, of whom 100 or thereabouts remained faithful, and two or more guns of the battery against organised bodies of rebels reported to be approaching or hanging about our neighbourhood, but they had too great a dread of the guns which had been mounted on the fort to come close, one on a traversing platform made in the magazine workshops having somehow obtained the reputation of being able to hit objects at a distance of five miles! On one occasion, in September 1857, a detachment thus composed under command of Colonel Dalyell proceeded to Nurreeaolee where they had a skirmish with a body of rebels. Among the killed on our side was Colonel Dalyell, much regretted by all of us. Before the detachment returned to Saugor in the evening a report was received that it had been cut off, upon which Brigadier Sage asked me to take command of two more guns from the battery, to complete the crews for which I was obliged to call for volunteers from the warrant and non-commissioned officers of the Bengal and Madras Ordnance establishments then working under me. I was asked by the Brigadier to take charge of these guns, as Captain Marshall had taken with him his only subaltern, and there was no other artillery officer in Saugor, except Lieutenant Willoughby, who had not

recovered from the injury he met with at Balabet Fort. This was the only occasion the Brigadier would hear of my leaving the fort, for being a cripple himself I was really everything to him within the fort. While a detachment of Native Infantry was being collected from cantonments to support these guns, another report was received that Col. Dalyell's detachment was on its return to Saugor, much to the joy of my wife and that of the wife of Captain Marshall, because the latter had not been cut off and possibly killed, and because I was not proceeding on a forlorn hope. Some time during the autumn Brigadier Sage received a communication from the Commissioner (head Civil authority) at Jubbulpore for the Saugor garrison to retire on that station, the why or wherefore and the fact itself were not then made known to me. This led the Brigadier to send for me, and on my appearing before him he inquired how long it would take me to blow up the powder magazine; I replied I could manage it within half-an-hour. This reply did not apparently suit the object he had in view when asking the question, for he further said, "Don't you think you could do it more effectually if I allowed you a couple of hours?" I replied in the affirmative. He then mentioned that Major Erskine, the Commissioner, had suggested the retirement, and that if such were carried out it would be necessary, not only to blow up the powder magazines, but also to destroy sufficiently extensive portions of the fort in order to render its subsequent occupation by rebels, &c. untenable, and inquired how long this would take and whether it could be done without the matter becoming public. The latter I said was improbable, and the work would occupy some days: whereupon the Brigadier evidently informed the Commissioner that the proposed retirement was utterly impracticable. If it had been carried out, even without the preliminary demolition of portions of the fort, the probabilities are that many lives would have been sacrificed during the retirement, for we should no doubt have been attacked all along the road.

The moral to be drawn from the manner in which we were saved at Saugor during the Mutiny of 1857, also people at other stations, where, by the presence and aid of British troops, the authorities were enabled to disarm the native soldiery in anticipation of an outbreak, and the miserable and untimely end to which some of our fellow countrymen, women and children came to, where circumstances did not allow of such action; or where officers in command of stations placed too implicit confidence in the discipline, good behaviour, and plighted word of intending mutineers, as well as the terrible tragedy enacted previous to, and during the retreat from Cabul in January 1842, and the late disgraceful treachery and massacre at Munipore, is—

(1.) Never place yourself in the power of an Asiatic—rather fight it out to the very last, however hopeless the case may be, and do not yield while there is breath in your body and strength in your arm to strike a blow. Example, Sir Robert Sale's defence of Jellalabad during 1842 with two regiments of infantry (one British and one Native), and a Field Battery of Artillery against all the forces of Mahomed Akbur Khan, who had immediately previously annihilated the Cabul garrison of more than double the strength.

(2.) When dealing with an Asiatic enemy never hesitate to take the initiative, unless, of course, the odds against you are fearful; but even then, a display of boldness will sometimes overawe ten or twenty times your own strength.

Whatever you do, never forget how readily the Afghans forfeited their Treaty pledges in 1841–2, and the wretch Nana Sahib (an educated man), and our own trusted Sepoys and Sowars at Cawnpore in 1857.

P.S.—The foregoing narrative was written at the request of relations. Though rather personal, the writer thought its perusal might prove interesting to some brother officers, and with this view the paper was offered to the R.A. Institution.

THE CENTENARY OF THE ÉCOLE POLYTECHNIQUE, CELEBRATED IN PARIS ON THE 11TH MARCH, 1894, UNDER THE AUSPICES OF FRANÇOIS SADI CARNOT, PRESIDENT OF THE REPUBLIC, AND AN OLD CADET OF THE SCHOOL.

BY

CAPTAIN S. P. OLIVER, *late* R.A.

It has been thought that a brief sketch of the celebrated French School, which has educated so many gallant soldiers and philosophers across the channel, will be acceptable to the officers of the Royal Artillery on the occasion of its one hundredth birthday. I have, therefore, forwarded the accompanying translation of an article in "*Le Temps*," for the publication of which permission has been very courteously accorded by M. Adrien Hébrard, the able Directeur politique of that journal.—*S.P.O.*

The École Polytechnique.

"La nation, la loi."

"The greatness of this school is worthy of the people for whom it has been designed; it will be without a parallel in Europe." Such were the terms in which Antoine François de Fourcroy, the celebrated chemist and Deputy (the successor of the more famous Marat), in the name of the Committee of Public Safety, proposed at the sitting of the Convention, on the 24th September, 1794, a grant of money from the Paris establishment, for a central school of public works, where the instruction should be based upon mathematics and physics, and whose purpose it should be to furnish technical experts and engineers for the several services of the Republic.

France, at that period, was labouring amidst great difficulties. Foreign war raged without, and within the realm the "Terror" had paralysed all commerce and progress, so that the whole country was well nigh disorganised. The enemy threatened the frontiers, insurrection blazed in the towns and country, whilst the nation was without arms, without powder, without factories, without arsenals. The Committee of Public Safety called to its aid a whole "pleiad" of savants,

and all that genius and energy could effect from the resources at their command was employed, in order that France might be enabled to defend herself against all Europe, and to supply her own necessities during the continuance of a long war—indeed, according to the expression of Biot, an eternal and terrible strife. It was at this time that a school, a nursery for talents and devotion, had appeared necessary to those men to whom the state of their country caused deep anxiety. Carnot, Romme, Prieur, Monge, Lamblardie and Fourcroy had many a time pondered over this problem in the midst of the vicissitudes of that eventful time. "We have very often discussed between ourselves, Carnot and myself," states Prieur (of the Côte-d'Or), "about the necessity of forming a school for the instruction of engineers; but the flood of other affairs long prevented our taking up the subject—urgency alone has impeded us." And, in fact, at that very time Carnot was preparing the second great requisition, organising the demi-brigades, and drawing up the plan of the campaign which Jourdan was to carry out. In the midst of all the confusion caused by the threatening invasion, the need of qualified military engineers was daily becoming more and more apparent. The Committee of Public Safety became well aware and sensible of this terrible defect, and, on the 21 Ventôse, An. II. (equivalent to the 11th March, 1794), the creation of a central School of Public Works was requested from the Convention, by the mouth of its representative Barère. A commission of savants, including Monge, Berthollet, Chaptal, Vauquelin and others, had already been nominated, and immediately, at the very darkest hour of 1794, when such sanguinary executions marked the "Reign of Terror," the organisation of the Ecole Polytechnique was commenced. "Thus," Michelet was able to say, "was revealed the immortal greatness of the Convention, by the power which it exhibited of carrying on simultaneously battles, where its sons shed their life's blood drop by drop, and studies by which it worked for the benefit of future generations."

Certificate of Patriotism.

The Law of Organisation was voted on the 28th September, 1794 (7 Vendémiaire); and among other clauses regulating admission to the school, it was specified that all candidates must be recommended for their practice of republican virtues, and by having constantly manifested their love of "Liberty, Equality and Hatred of Tyrants." This requisite certificate of citizenship was the means of causing numerous exclusions; among those thus nearly excluded being Poinsot, who subsequently became one of the greatest of French geometricians. "The exhibition of his patriotism" wrote the appointed citizen-examiner "has been *nil*." Nevertheless, upon his swearing eternal hatred to all tyrants, Poinsot, in spite of the above examiner's report, was declared worthy of serving his country. The method of his passing his technical examination was not less curious. Poinsot, it appears, then knew absolutely nothing of mathematics. So when the examiner tested him by a simple question of algebra, he replied "Citizen! I do not know any algebra, but I promise to do my best to learn it." The examiner, fortunately a keen observer of youth, judged rightly of his

intelligence and admitted him. The event well justified the examiner's prescience. Nearly four hundred pupils were thus admitted to the school and lodged in the old Palais Bourbon, then re-named the *Maison de la Révolution*, and built upon the site of the once famous "*Pré aux Clercs*," so long the scene of scholastic galantries and students' exploits. Citoyen Jacques Elie Lamblardie, who had lately been summoned from Cherbourg to become Inspector-General of the *Ecole des ponts et chaussées*, was appointed Director of the newly-established *Ecole Polytechnique*. A uniform was adopted by the advice of this competent engineer, as he remarked that the young republicans were more distinguished for their patriotic zeal and talent than for their elegance or decency of costume, which can readily be imagined to have been somewhat free and easy. Within a short time the students were clothed in the uniform of the gunners of the National Guard, blue coat and breeches, red facings, three-cornered hat with red feather, and brass buttons bearing the motto "*La Nation, la loi!*"

The First Opening of the School.

The opening of the first term took place on the 19th December, 1794. Monge directed the course of study, and organised the staff of instructors; the first savants of the day assisted him as professors of the various classes. In spite of this the school was subjected to extreme criticism. The expenses of the establishment were objected to, and it almost became a question of suppressing the school. Prieur defended the Polytechnic School in a memoir before the Commission entrusted with the preparation of the Constitution of the Year III. He called to mind the advantages which France would derive from this establishment, etc., and thus saved the institution; whilst the law of (15 Fructidor An. III.) 1st September, 1795, finally removed all fear of suppression. The 1st Article of this law, inserted in deference to Prieur's proposition, laid down that henceforth the school should take the name of the "*Ecole Polytechnique*;" and the following Articles regulated its relations with the several schools of Artillery, Engineering, Mining, Roads and Bridges, etc. From that date the *Ecole Polytechnique* ranked among the general scientific institutions of France; and Fourcroy, the President of the School Council, wrote to Prieur:—"The School will never forget the services which thou hast rendered it, and the obligation which it owes thee, for the success of this great national enterprise."

In truth the school has not forgotten Prieur, any more than it has forgotten Monge, who was the soul of the institution throughout the whole period of the duration of the Revolution and of the first Empire; nor has it forgotten Lamblardie, who was its first director, or Carnot, who in the midst of his victories, carried out his idea of a great national establishment of sciences and prepared the decree of its foundation, which Fourcroy and Prieur submitted to the Convention of the 11th March, 1794.

Prominent Position Assigned to the School.

The original idea of the Ecole Polytechnique had been the creation of a common school of science, replacing all others in existence pre-

viously, but in order to maintain the older existing schools of applied science, Monge and Prieur, were obliged, by order of the Directory, to prepare a new organisation which should work in harmony with them. This organisation, which was approved on the 26th March, 1796, made the Polytechnic School the nursery of the other establishments.

By reason of the general estimation in which the school was held, and by the consideration which the Parisian people ever exhibited towards them, the young Polytechnicians, who were fully sensible of their position and influence, became forced to take a prominent part in the exciting events of the day, which succeeded one another rapidly during the earlier portion of the school's existence. And, in fact, they have always taken part in the popular manifestations which marked this epoch. The Convention could not have had more zealous defenders than these young and patriotic cadets. If by chance some few were led to enrol themselves in the train of the "*jeunesse dorée*" of Fréron, if some others now and then got mixed up with the gay "*muscadins*," yet the large majority was ever faithful to the Convention and to the civic oath which they had signed :—"I swear to be wholly loyal to the Republic, and to swear an eternal hatred to Royalty." Whenever the noise of the gatherings in the street reached them it was difficult to restrain them.

On the evening of the 1er Germinal when the crowd raised, under their windows, a cry of "Can you coolly go on with your drawings when your comrades are having their throats cut?" the cadets rose in a body and sallied out to join the armed force.

The school was always invited to all the national *fêtes*, to all the ceremonies. It always had its acknowledged place reserved, and in all processions marched immediately after the authorities; yet, nevertheless, its attachment to the Republic was sometimes mistrusted. Some deputies at last accused certain of the cadets of being contaminated with incivism; upon which the Directory issued, one day, a decree as follows :—"Proceedings will be taken forthwith for the purging of the students of the Ecole Polytechnique by the exclusion of those who have given signs of possessing anti-Republican sentiments." Several times Prieur was obliged to speak in favour of the school in order to protect it. Nevertheless, its high position seemed fairly assured, when, all of a sudden, the Committee of Fortifications attacked its privileges, alleging that these privileges were the means of excluding many young men of merit from the public services, and that they acted as a restraint on emulation. The Directory yielded; the Council of the Five Hundred found itself in disagreement with the Council of Ancients; Monge and Prieur came again to the rescue, addressing speech upon speech, pleading in its behalf, and the school knew not what would happen, when the 18th Brumaire took place putting a final end to the discussions of the two assemblies. The First Consul decided in favour of Monge, and on the (25th Frimaire An. VIII.) 16th December, 1799, Bonaparte re-organised the school by a law which has remained the sole law of organisation of the Ecole Polytechnique. Later, various governments have modified it by decrees and ordinances, but no legislator has since interfered in

this organisation, and the law of Frimaire is the real charter of the school.

Under the Empire.

The same Bonaparte, who had thus saved the school when Consul, overturned it when he became Emperor. The school which had protested at the 18th Brumaire, also protested at the proclamation of the Empire. Napoleon could not pardon this. In spite of the counsels of Monge and the flattery of Fourcroy, Napoleon transformed the school—he militarised it. By a decree, dated 16th July, 1804, the cadets were henceforth obliged to be put through their drill and treated like recruits in barracks. A new uniform, nearly resembling that of infantry of the line, was given to them. Instead of receiving as before a salary of 1200 livres, they were now obliged to pay to the State for their board and education at the rate of 800 francs per annum. The school was, moreover, moved into the old College of Navarre, where it still remains, and on the 3rd December, 1804, it participated at the review on the Champ de Mars, when eagles were distributed to the regiments. The first for promotion, who was Arago—afterwards the eminent astronomer—received the flag from the hands of the Emperor. After this event the course of instruction tended more and more to the military art: letters were put aside, and it was considered that the candidates were qualified if they knew sufficient Latin to translate the "*de officiis*" of Cicero. Napoleon took a strange view of the Ecole Polytechnique; for one day, desirous of rewarding a youth, 15 years of age, who had distinguished himself in action, he nominated him as a fit pupil. The Polytechnicians, rebellious against the Empire, were gained over by the glory of the great warrior and the constantly recurring series of victories gained by the Emperor. Each day the latest bulletin from the armies was read aloud in the amphitheatre; and after Austerlitz there was a burst of enthusiastic admiration and wild applause. The school became firmly devoted to the hero of Marengo.

It is to Napoleon that the school owes its fine voltaic pile. One day, as Berthollet was talking to him about the works, by Davy, on electricity, he asked with some warmth why these experiments had not been tried in France, and when Berthollet replied that it was because there was not a voltaic pile sufficiently powerful in the country, "*Eh bien!*" he cried out, "a sufficiently strong machine for this purpose must be constructed immediately."

"Vive L'Empereur!"

In 1811 more liberal ideas took possession of the Ecole Polytechnique. After the attempted *coup-de-main* of General Mallet, the cadets again made manifestations against the Imperial despotism. One fine morning all the black boards were found, inscribed in chalk, with the following verses:—

> "*Le monde est un atome où rampe avec fierté*
> *L'insecte usurpateur qu'on nomme Majesté.*"

Napoleon took umbrage and resolved to disestablish the school. The project of a decree was drawn up at the Council of State; the

first article stating :—"The Polytechnic School is suppressed, and in its place is created an Ecole Napoléonienne for the public services." The school, however, was saved by the events of 1814. The hour of disasters sounded. Petty rancours and jealousies disappeared before the danger of the commonwealth; and the young cadets again shouted, "*Vive L'Empereur !*" and demanded to be led against the enemy. On the 21st March, together with several collegians who had joined them, and among whom was to be found Alfred de Vigny, the cadets of the Polytechnic defended the Barrier du Trône, and fought with heroism against the troops of the Prince of Wurtemburg. Among this band of gallant youths, fighting in the ranks, were Carnot, Enfantin, Michel Chasles, etc. On the return from Elba, when the white flag of the Bourbons was taken from the Vendôme column, there was immense excitement among the cadets, who hailed with delight the glorious arrival of Bonaparte in Paris, only to disappear for ever after the hundred days !

Full of reminiscences connected with the Imperial epoch, the school refused to rally to the Restoration. The Royalists were wont to reproach the school for following too closely the traditions of liberty, impiety, and even license. Meantime the re-awakening of industry, with the necessity for a period of peace and calm, required an institution which might be a centre of instruction for young men, whose task it should be to apply science throughout the country and to labour for its renovation. A royal ordinance appeared on the 4th September, 1816, suppressing the military *régime* in the school, which had caused General Foy to declare that :—"The Empire has transformed a nursery of *savants* into a seminary of warriors !" and re-organising the institution by placing it under the protection of the Duke d'Angoulême.

The usual acts of insubordination which had broken out under the Empire were re-commenced in a more pronounced fashion; and by such means the cadets obtained regular leave of absence on two days in the week, Sundays and Wednesdays. From this period may be dated the "*brimades*" (hazing), the mystifications, initiations, etc., to which the juniors and "last-joined" were forced to submit, as so-called *conscrits*, at the hands of the seniors, or *anciens*, the old cadets. This term of *conscrit*, although it was designated as humiliating by the then director, has, nevertheless, survived and come down to the present day. A code of laws, to which obedience was necessary, was also composed in this same year. It is the original of code X., still actively in force, which regulates the relations between themselves and with their professors. It begins thus :—

> "*L'ancien parle. Conscrit, tiens ta langue captive*
> *Et prete à ses discours une oreille attentive.*"

At the death of the Duke de Berry, against whom there existed considerable personal animosity, a popular manifestation of joy took place at the school. On the 18th July, 1818, one of the bi-weekly holidays, in defiance of the prohibition issued by the authorities, the whole of the scholars betook themselves to the tomb of Monge, whose funeral had taken place on the previous day, and on it they deposited a bough of

oak and a branch of laurel. In spite of all the interest which Charles X. attempted to show for the school, nothing was able to gain over the sympathy of the school to the Bourbons. It belonged *en masse* to the Opposition. Charras, who many years later was a Minister of the Revolution of 1848, was, at this time, "sent down" for having sung "*La Marseillaise*" at the annual dinner of the school in 1830.

The Revolution of July.

The Revolution was approaching. During the three days of July the Polytechnic cadets covered themselves with glory. In all quarters they were to be seen at the head of the insurrection. Charras was particularly distinguished by his activity. Entering into the school with a fireman's helmet on his head he had harangued his comrades with a glowing account of what was passing in the streets of Paris, and the Polytechnicians had immediately spread in all directions. At the Porte Saint-Denis, at the Porte Saint-Martin, in the Faubourg Saint-Antoine, it was they who took command and headed the bands of insurgents. At the attack of the Barracks of Babylone, Vaneau was pierced with a bullet through his head and fell dead. At the same time Bosquet, afterwards a Marshal of France, took possession of the Louvre. The National Guards, unskilled in the art of artillery, and ignorant of gun-drill, were only too glad to place themselves under his directions. After the fight, the Polytechnicians assembled permanently at the Hôtel-de-Ville, ready to carry orders, to direct detachments, to aid the working men and to succour the wounded. Some were entrusted with the guard of public buildings and monuments, whilst others patrolled the town to re-establish order and tranquility at the head of detachments. The popularity of the school became immense. The poets sang its praises in verse, whilst distant towns sent addresses of felicitation to the school even from beyond the frontiers of France. Rheims sent it a present of 150 bottles of champagne; Bordeaux offered to Bosquet a grand banquet, when toasts were proposed amidst cheers to the honour of the institution, to which Bosquet replied:—"Our school has always been the *School of the People*, and in joining their ranks in 1830, as in 1814, it has only done its duty." In the theatres and at concerts, stanzas and allusions to the Polytechnic School were applauded. In the midst of all this popular favour and glorification, the school did not forget their slain comrade, Vaneau. Military honours were rendered to his body, and his companions erected a monument to his memory, whilst every year after his death, a deputation of cadets proceeded on the 25th of July to place wreaths and flowers upon his tomb.

Under King Louis Philippe d'Orleans.

On the 6th August Louis Philippe was presented to the school by Lafayette and congratulated it. The revolution of 1830 brought about certain changes in its organisation. Guizot appointed a commission to enquire into the modifications necessary to the proposed change of organisation of the institution and the school was re-established on a military footing. Subsequently it took part in all the political events of the day, and appeared at the funeral of Benjamin Constant, and that

of General Lamarque (6th June, 1832), where its behaviour attracted the notice of Louis Philippe, who caused their ranks to be disbanded. In 1832, for the first time the journal of the school made its appearance, entitled, *Le Récréatif;* it treated of politics, literature, music, &c., and contained anecdotes. It only lasted five months. At the same period was inaugurated the "*Bal des fruits secs,*" a burlesque fancy-ball, where the most eccentric of costumes were exhibited. This festival disappeared in 1848, but was resuscitated, or rather replaced, in 1861 by the "*Fête du point Gamma,*" a tremendous masquerading function, which was held at the vernal equinox. In 1833 a certain incident brought the school before the Court of Assizes. Four of the students were found, during a raid of police, in the cellars of a house suspected of secretly manufacturing explosives and ammunition. Proceedings were instituted against these young men and their accomplices, amongst whom was Raspail. Defended by the great orator, Michel de Bourges, the four cadets were acquitted; but in order to manifest their displeasure against the King, by whose orders they had been thus attacked, the Polytechnicians erased the word "Royal" from the inscription placed above the entrance gate of the school.

It was about this time that the scholars had a somewhat comical quarrel with Théophile Gautier, who had styled them "*Embryons d'immortalité*" (as naval cadets used to be called "sucking Nelsons"). The senior class sent two of their number to the author of *Capitaine Fracasse,* who received them in his dressing gown and slippers, with a night-cap on his head, in his study. The two envoys returned, saying to their comrades, "There is nothing to be done with this Pantaloon!" For several days it was asserted that Gautier did not dare show his nose in the street for fear of them. Twenty-five years previously, Malte-Brun having written an article against Biot, member of the Institute, an old cadet of the Polytechnic, forty-five of the students had sallied out to pay him a visit at his house, and then and there, whilst some mounted guard to prevent interruption, inflicted a severe drubbing on that well-known geographer. Such parallel instances of what our neighbours term "solidarité" are not often placed on record.

The Second Republic of 1848.

On the 24th February, 1848, the "rappel" beat loudly in the streets, and Paris was speedily covered with barricades; the cadets were in a state of excitement, which increased on hearing the sound of the drum. On the proposition of one of them, young de Freycinet, they decided to march out *en masse,* and to throw themselves between the opposing combatants in order to stay the effusion of blood. They spread through Paris, applauded everywhere by the people, who had learnt during former revolutions to admire these young fellows and, moreover, to trust in their sagacity and coolness. The provisional government selected twenty of their number as aides-de-camp, amongst whom was de Freycinet (the future President of the Council of Ministers under the Third Republic), who had escorted Dupont de l'Eure up to the Hotel-de-Ville, where he remained under the orders of the Provisional Government. It was he who was the "*Polytechnicien froid, pareil*

au Bonaparte silencieux de Vendémiaire," of whom Lamartine makes mention in his well-known "History of the Revolution of 1848." On the 29th February the Provisional Government publicly presented its thanks to the scholars of the Ecole Polytechnic for having, from the first day of the Revolution, placed itself at the service of the country. Similarly, in 1830, the National Guard had declared that there was not a citizen who had not been touched with admiration for the glorious uniform of the Polytechnic School.

Nevertheless, the school was just now threatened with suppression. Several notable politicians were much displeased by this consistent participation of the school in all the popular manifestations. Odilon-Barrot publicly declared that he wished to put an end to such business in the future; whilst Le Bœuf, then Commandant of Artillery, took up the cudgels in defence of the school and succeeded in averting the danger. It was next proposed to divide the establishment into two sections, one civilian and the other military. The Prince-President, Louis Napoleon, nominated a mixed commission, to study the question of its reorganisation, and on the 1st November, 1852, appeared the decree which lays down the regulations in force at the present day, with certain modifications introduced after the adoption of the military laws. The school had little sympathy with Louis Bonaparte, who took good care to have it seized and occupied on the occasion of the *Coup d'Etat*, on the 2nd December, 1851, otherwise the cadets would undoubtedly have joined the Republicans against Napoleon "*le petit.*" They were ever afterwards hostile towards the Empire of Napoleon III., and twice they narrowly escaped suppression. On one occasion, during the march past of the troops on the Champ de Mars, in 1855, when the French army had returned from the Crimea, the cadets of the Ecole Polytechnique passed before the Emperor without a sound of acknowledgment, and when the Prince Imperial visited the school he was received there in the midst of a chilling silence.

The Franco-Prussian War.

When the war broke out in 1870, several of the senior cadets were sent to the front, whilst the others remained at Paris and went through all the privations and horrors of the siege, taking their full share of duty on the ramparts and at the out-posts. On the 4th January, 1871, the Government of the National Defence re-opened the school at Bordeaux, at a solemn meeting under the presidency of Crémieux, supported by Gambetta and de Freycinet. On the 15th March the school returned to Paris, and on the 18th the insurrection broke out. The school, as a whole (one or two dissident voices alone excepted), declared for the Government of Versailles, and, on the 7th April, it was re-opened at Tours. After the suppression of the Commune it returned to its old quarters in Paris. It was in the court-yard of the school that Maurice Treillard, the Director of Public Assistance during the Commune, was shot. In 1874 the present uniform worn by the cadets was first adopted. In 1875 Gambetta paid a visit to the school, and, recalling to mind the energy and devoted zeal which the cadets had exhibited in 1871, in the organisation of camps and the manufacture of arms and

ammunition, he pronounced the following words—"Without the Polytechnic School, the work of the national defence would have been impossible."

Thus, through numerous revolutions and changes of government, through temporary disbandments and suppressions, in despite of all threatenings and antipathies from both the empire and the monarchy, the Polytechnic School, the creation of the French Revolution has passed safely through alternate periods of trouble and of calm, and has now been enabled to celebrate its centennial anniversary under the auspices of the able President of the Third Republic. Having partaken of an active share in all the great events of the age this school has seen those who have issued from its ranks occupy the highest posts attainable in the Army, in the Navy, in Science, in Arts and in Literature, as well as in Politics. Not a few have rendered their names illustrious by bringing their science to open out new paths of research. Among these may be named Arago, Gay-Lussac, Poinsot, Biot, Thénard among many other honourable savants. The Saint-Simoniens and the Positivists have, almost all, been recruited from among the former students of the Polytechnic—Enfantin, Jean Reynaud, Auguste Comte, Michel Chasles.

The list of those who have attained the highest military ranks—Field-Marshals and Generals—would be too long to quote in this brief notice. There has not been a single Government which has not numbered in its ranks some Polytechnicians among its Ministers, and two among these have occupied the very highest posts in the country, viz., General Cavaignac and M. Carnot. On looking at the names of all those of whom the school may boast itself of having been the *alma mater*, it is impossible not to feel that the Polytechnic has fulfilled to the utmost the fondest hopes of those who created it a century ago; and it has not failed in the task confided to it, or fallen short of the prophecy which Biot uttered as long ago as 1803. "In creating the Ecole Polytechnique, it has been our wish that a vast column of light may at once arise in the midst of this desolate country, and attain such an elevation that its beams may shine over the whole of France and illuminate the future."

The Present Centennial Anniversary.

The Committee of organisation for celebrating the centennial anniversary of the school was presided over by M. Faye, the celebrated astronomer and member of the Institute; the members including MM. Joseph Bertrand, Member of the Academy, Secretary of the Académie des Sciences; Bouquet de la Grye, Schlœsing, Sarrau, Bassot (all Members of the Institute); Cheysson, Guillemain, Fargue, Inspectors-General of Ways and Bridges; M. Linder, Inspector-General of Mines; Dislère, Councillor of State; Claude Lafontaine, banker; de Lapparent, the illustrious geologist; Pinet (author of a history of the Polytechnic School); Generals Borius, a late Commandant of the School, now Secretary-General of the Presidency of the Republic, Borgnis-Desbordes, de Lavalette, de Villenoisy; Colonel Laussédat, Director of the Conservatoire des Arts; General André, the Commandant of the

Ecole Polytechnique; Colonel de Rochas, Administrator of the School; and M. Mercadier, Director of Studies—all former Polytechnicians.

This Committee had the choice of several dates on which to fix the celebration of their centenary:—(1) the 11th March, 1794 (21 Ventôse, An. II.), when, at the instance of Lazare Carnot, the Committee of Public Safety first brought before the Convention the proposal to create such an institution; (2) the 28th September (7 Vendémiaire), when the Convention actually voted the decree authorising the scheme of organisation; (3) the 19th December, the date of the opening of the school, when the first term of study commenced; (4) the 1st September, 1795 (15 Fructidor, An. III.), when a law was passed decreeing the definite organisation of the establishment, and giving its title, L'Ecole Polytechnique. The Committee rightly selected the first of these dates, and accordingly on Sunday, 11th March, 1894, the above Committee, headed by their illustrious chief, at four o'clock in the afternoon, proceeded to the 'Elyssée, where they were received by M. Carnot, the President of the Republic, who had himself been a scholar of the Polytechnic 37 years previously, leaving it in 1857, who was supported by two other old Polytechnicians, General Bornis and Colonel Pistor. (Colonel Pistor, leaving the Polytechnic in 1869, received the Cross of the Legion of Honour on the 20th August, 1870, for his distinguished conduct in the field at the battle of Frœschviller; and was mentioned in general orders for his gallant defence of Abbevilliers on the following 16th January).

This visit to the Chief of the State by such a representative gathering of the most distinguished of his old comrades, and all old Polytechnicians, was looked upon merely as an official demonstration of homage paid to the old cadet, who had arrived at the highest position possible in France, and a grandson of the great promoter of the original school, viz., M. Carnot, now the worthy President of the Republic. A medal commemorative of this centennial anniversary, designed by Max Bourgeois, was presented to the guests, representing, on the obverse, Science, surrounded by her discoveries, balloon, light-house, railway, bridge, telegraph, cannon, etc., and bearing on the reverse these four names—"Lamblardie, Monge, Carnot, Prieur," and below this inscription:—

"Centenaire de l'Ecole Polytechnique
(Decret de fondation—11 Mars, 1794).
M. Carnot (promotion de 1857),
Etant Président de la République."

The deputation offered to their senior "*ancien*," who now holds the highest post in the country, a "*Livre d'or*," in which has been set forth the important *rôle* which the Polytechnic School has played in the past, and the numbers of her children which she has sent forth to speed by their knowledge and skill the progress of civilisation during the last hundred years. Indeed, 16,000 young men have passed through the lists of the school since its initiation; and of these more than 7,000 are still living. These will read with pride the history of those who have preceded them, and the circumstances in which their school showed

itself so well deserving the judgment pronounced on it by the Emperor Alexander at the Congress of Aix-la-Chapelle:—"It is by far the finest institution which has been founded by man!"

[This *Livre d'or*, it may be stated, is the first of three superb volumes which have been published in honour of the centenary; the first is entitled *L'Ecole Polytechnique et la Science*; the second, *L'Ecole Polytechnique et l'Armée*; and the third, *L'Ecole Polytechnique et le Génie Civil*; the whole work having been composed by former cadets of the school, and containing a collection of souvenirs, traditions, episodes, incidents and anecdotes connected with the school from its commencement, together with a record of the services and brilliant actions of former students who have become illustrious. The first volume only, so far, has been actually completed in time enough to be presented to M. Carnot on this occasion. It commences with a preface by M. Joseph Bertrand (whose jubilee as professor happened on the 18th March), followed by an historical notice of the school and its instruction, by MM. Mercadier and Rochas; the posthumous biographies of past illustrious savants who have been educated at the school; and a chart of the academic history of the institution. The two volumes which complete the work are nearly finished and will be shortly ready for issue.]

M. Faye, speaking in the name of the committee, had the honour of offering to the President the first volume of the great work which the old cadets of the school had published as a worthy celebration of the centenary of the foundation of the Polytechnic. "We are happy" he added "to pay this solemn homage to our illustrious comrade whom France, by a happy inspiration, has placed at her head."

The President replied:—"*Mes chers camarades, laissez-moi en vous appelant ainsi, prendre ma place entre mes anciens, mes contemporains et mes conscrits, je suis profondément ému de la démarche que vous faites auprès de moi. Je marque d'une croix blanche cette journée où il m'est donnè de vous recevoir et de vous remercier tous, au nom de notre mère commune de ce que vous avez fait pour honorer l'Ecole polytechnique. En résumant l'œuvre des cent premières années de son existence, vous avez élevé à sa gloire un monument dont tous ses enfants ont droit d'être fiers, et vous donnez aux générations qui nous suivront un exemple et un encouragement précieux, dont les polytechniciens de l'avenir sauront profiter pour vouer à la patrie tous leurs efforts, sous la bannière de la science et de l'honneur.*"

The Committee intend to give a grand *fête*, in honour of the centenary, consisting of a ball and concert in the grand hall of the Trocadéro, sometime during the ensuing month of May, when all old Polytechnicians, numbering some seven thousand, will be invited to this immense family re-union of the school. M. Dupain, Professor of Design at the school has prepared a sketch of the reception at the Elysée, which will be exhibited at the Trocadéro on this occasion, and from which a painting is to be made which will be exhibited in the Salon next year.

ELECTRO-METALLURGY

ALUMINIUM.

BY

CAPITAINE D'ARTILLERIE J. ROUSSEAU.

Précis of a Paper published in the "Revue d'Artillerie

BY

F. E. B. L., *late* R.A.

I.—PRINCIPAL APPLICATIONS OF ELECTRICITY TO METALLURGICAL OPERATIONS.

WORKING OF METALS HOT.

The heating of a considerable mass of metal is an operation not free from difficulty, and which should be carried out with care: the injurious effect of molecular tensions which would be enhanced by rapid or intense action must be guarded against. The phenomena which occur within the mass of a metallic block submitted to heat are not purely physical; it has been recently discovered, in raising the temperature to the point of fusion, that there are a certain number of stages characteristic of each metal, which are real points of chemical change. When the temperature of the metal passes these critical points the molecular arrangement is modified, and we find produced by heat alone, and apart from the influence of the surrounding medium, internal disturbances, dissociations, or recombinations. These facts recall the allotropic modifications of sulphur and phosphorus under the action of heat. Simple metals, like aluminium, appear to have but one critical point. The malleability of zinc, for instance, is at its maximum at 200° cent. (392° Fahr.), but in more complex metals, such as cast and wrought-iron, steel, and bronze, there are several critical points, and each represents a particular modification: thus one of the three critical temperatures of iron is 750° cent. (1392° Fahr.) which corresponds to the disappearance of magnetism. In dealing with heat therefore, according as we obtain these critical points with more or less rapidity, the mechanical properties of the metal in its final state vary in a sensible degree. The operations of annealing, hardening, and forging should accordingly be based on a knowledge of the critical temperatures characteristic of each metal.

It must be admitted that the apparatus and procedure employed in the heating of metals are imperfect; they are entirely empiric, and left usually to the discretion of the simple workman. Electricity will doubtless in the future admit of a sensible improvement by affording in conjunction with heat a measure and regulation of the calorific energy brought into play. Already some attempts appear to have been made in the United States to anneal metallic wires, and to heat springs by the passage of a current before hardening them. Electric welding has also been employed in the fabrication of iron wheels and forged steel shell, also for rails and the felloes of velocipedes. Professor Elihu Thompson employs currents up to 100,000 ampères, with a feeble electromotive force, below one volt, which he obtains by the aid of induction transformers. He has been able to weld directly metals such as German silver and platinum, which have hitherto resisted that operation without the aid of another metal.

ELECTRIC FUSION.

In the present metallurgical hearths the calorific intensity obtainable is somewhat limited; the mean temperatures measured with an optical pyrometer by M. H. Le Châtelier were the following:—

	Cent.	Fahr.
Blast furnace (with tuyeres)	1900°	or 3452°
Bessemer converter	1600°	„ 2912°
Martin-Siemens furnace	1550°	„ 2822°

It is difficult in a blast furnace to produce alloys of iron rich in chromium or tungsten, which however are matters of pregnant interest. We are far from attaining the temperatures of the combustion of gases burnt in the laboratory, for combustion in an industrial hearth is a complex phenomenon on account of the multiplicity of elements which form its atmosphere. After a certain limit is passed there is *dissociation*, the calorific energy produced has to perform molecular work, and in consequence the temperature can no longer increase. The electric current gives much higher limits: M. H. Le Châtelier has measured:—

	Cent.
At the positive carbon point of an arc lamp	4000°
„ negative „ „ „ „ „	3000°

The voltaic arc can therefore be advantageously applied to the fusion of even the most refractory metals. In the electric furnace of M. H. Moissan, lime, strontia, and magnesia are rendered liquid like water, and metals believed to be infusible, such as tungsten and molybdenum, are obtained in a molten state; even silicon, the most refractory element in an ordinary furnace, has been volatilized.

We must go back to 1878 for the first industrial application of electric fusion made by W. Siemens for platinum. He conceived the idea of a cast-iron crucible with fire-proof lining, pierced at a third of its height by two opposite openings for the admission of the electrodes. The regulator of the voltaic arc thus formed was a mechanism set in motion by a bucket-wheel, worked by a stream of water or fine sand, and which was regulated by an electro-magnet placed as a shunt across the principal circuit. Since these first attempts electric furnaces have been developed, especially for the production of aluminium. We will first mention the best known of these, then consider them further in detail.

To avoid the wear and tear of electrodes Mr. W. Maxwell places the crucible itself between the two electrodes placed one above the other. In Parker's electric furnace several rows of large electrodes are arranged in one mass in refractory bricks, and underneath each of them a secondary moveable electrode serves to start the arc and to partially raise the metallic mass to a red heat.

Cross's electric crucibles are based on a different principle : instead of utilising the heat of the voltaic arc itself, a high temperature is produced by the incandescence of large hollow carbons ; the sides of the crucible, also of carbon, form the positive electrode, while the crayons constitute the negative one.

The above-mentioned furnaces are traversed by direct currents, but for some few years alternating currents have been in use. In Ferranti's system the most remarkable feature is the absence of an electrode in the interior of the hearth ; the crucibles are surrounded by circuits provided with iron plates to constitute a powerful magnetic field. Colby's crucible forms the secondary circuit of a transformer, the primary circuit being fed by an alternating current dynamo, and attempts are being made to manufacture steel in these.

To sum up, in comparison with ordinary ones, electric furnaces have the advantage of reducing to a minimum the loss of heat by radiation, and of considerably restricting the mass to be heated. In many cases, if the motive power is cheap, the electric fusion of metals may be more economical than the ordinary methods.

ELECTRO-METALLURGY.

The art of depositing a thin metallic layer upon another metal has been long known and practised in the form of gilding, nickel plating, and electrotyping. Afterwards electrolysis was utilised for the production even of metals. One of its most important applications is the refining of copper. In the metallurgy of this metal, when it has been brought to the state known as *black copper*, there are about 5 % of impurities, sulphur, iron, arsenic, antimony, lead, to be eliminated before it can be made malleable, and this elimination was only effected very incompletely by successive oxidations and a large expenditure of charcoal. The electrolytic process originated in 1872 in the *Norddeutsche Affinerie* of Hamburg, and has been considerably developed since in Europe and America, being now in use in more than 30 manufactories, producing daily about 30 tons of electrolytic copper of most superior quality. When copper is chemically pure it is very ductile and of a high electrical conductivity, unattainable by the old methods.

The general process of electrolytic refinement of copper consists in joining in series a hundred vats of wood or concrete lined with lead, and filled with an acidulated bath of copper sulphate dissolved in water. The kathode consists of a plate of pure copper ·04″ in thickness, and the anode of a plate of black or impure copper from ·4″ to ·6″ in thickness. When the current passes through the bath the sulphate is decomposed and the copper is deposited on the kathode, while the oxygen and sulphuric acid attach themselves to the anode, attack it, and re-form a sulphate wherewith to regenerate the bath ; the current, so to speak, carries the metal of the positive to the negative electrode. The impurities of the black copper are dissolved and precipitated at the bottom of the vats like mud, from which substances of commercial value can be extracted, such as sulphur and precious metals. At the *Norddeutsche Affinerie* 1·2 kg. (2·64 lbs.) of gold are annually extracted from the above residue. The strength of the current is generally from 25 to 35 ampères per square metre of the surface of the kathode. This gives about one gramme of copper deposited per ampère-hour. Important improvements in this manufacture are due to Mr. Thofern, viz., a better arrangement of the vats ; the use of a current of 1000 ampères at 20 volts ; advantageous arrangement of the conductors, whereby they absorb only 5 % of the total energy ; economical heating of the bath to 35° cent. (95° Fahr.) by the waste steam from the engines ; continuous circulation of the liquid by means of pumps and injectors analogous to those of sugar refineries ; automatic cleansing of the vats. From the metallurgical point of view the chief feature of the above system is the preliminary oxidation of the anode ; the copper

which constitutes this electrode is for the purpose oxidised when issuing from the furnace in a molten state, and its oxygen, disengaged by electrolysis, is free to oxidise the impurities of the bath. Some of these deposit themselves on the anodes in a thin layer of insoluble mud, which falls to the bottom of the vat and is automatically withdrawn. Mr. Elmore has devised an ingenious system for the direct manufacture by electrolysis of copper weldless tubes. His kathode is a hollow mandril of polished steel, filled with wood, which rotates; while the copper is being deposited on this cylinder, agate rollers pass up and down and give to the nascent metal compactness and homogeneity. These compressors have an automatic alternating motion like that of a planing machine table, and between two successive turns a layer of copper of about ·0003″ is deposited. The current has a strength of 180 ampères, which is six times greater than in the ordinary method.

In all the foregoing methods we have treated of products preliminarily purified: numerous attempts have been to extract copper from an electrolytic bath prepared with ores rudimentally and cheaply treated. In Italy Signor Marchese has succeeded with a sulphurous ore, melted at first in a cupola furnace, to produce by roasting a cupreous mass containing

Copper	35
Iron	38
Sulphur	27

which is run into plates to form the anode. To prepare the bath, a rich ore previously roasted is treated with sulphuric acid in leaden vessels. The kathode is formed as usual of a plate of refined copper.

MANUFACTURE OF ALUMINIUM.

H. Sainte-Claire Deville should be considered the creator of the metallurgy of aluminium, discovered by Wöhler in 1827, and industrially produced for the first time by the learned Frenchman in 1854. In a remarkable memoir published in 1859, which might be believed to have been written yesterday, the practical details of the manufacture are indicated in their entirety. Even the methods, whence have proceeded the electric processes of 30 years later, are foreseen, and all the physical and chemical properties of the new metal are described with perfect accuracy. Deville manufactured aluminium at some works at Javel by decomposing aluminium chloride with sodium. The chloride was obtained by treating pure alumina mixed with its own weight of tar in a gas retort raised to a red heat and traversed by a current of dry chlorine. The sodium was produced in wrought-iron cylinders in a reverberatory furnace from sodium carbonate reduced with carbon. He mixed chalk with both substances to render the mass less fusible, and to promote the production of vapours of sodium by the gaseous current issuing from the decomposed chalk. The temperature on the hearth rose to a white heat. The charge was the following:—

Sodium carbonate	20
Carbon	9
Chalk	3

Aluminium chloride was afterwards replaced by the double chloride of aluminium and sodium, which is more stable. This substance was obtained by treating in a reverberatory furnace with a current of chloride gas, a mixture of pure alumina (extracted from bauxite, a natural silicate of alumina and iron), sodium chloride and wood charcoal. These three substances, previously triturated in a dry state and intimately mixed, were reduced to a paste with oil, then formed into lumps and calcined. The re-action was produced by sodium with cryolite, a natural

double fluoride of aluminium and sodium, as a flux, a charge containing

Double chloride	100 kg.
Sodium	35 „
Cryolite	45 „

gives 10·5 kg. of aluminium.

The Deville process was costly and complicated; chlorine was at a high price, so was sodium; much fuel was used; the furnaces, subjected to high temperatures, wore out rapidly; the operations were slow and involved. Electricity has changed all this, and aluminium which in 1887 was worth £1 16s. per lb., now fetches only about 2s. 4d., and its price is likely still further to fall by the progress that can be foreshadowed.

ELECTRIC PROCESSES.

Although of recent date, these are already numerous, and may be classed under two principal heads. First, the *electrothermic*, that is utilisation of the calorific action of the current; the currents are at high potential, with an electromotive force equal to that of the voltaic arc, and never below 50 volts, and the electric energy appears to be entirely expended in the form of heat. Secondly, the *electrolytic*, where the differences of potential are much smaller, and where, if the scheme is really industrial, they should approximate to the minimum electromotive force of decomposition of the electrolytes treated. The action is comparatively simple, the weight of aluminium produced bears a direct ratio to the quantity of electricity passing through the electrolyte, whereas the electrothermic process is more complex, and cannot be absolutely said to involve any electrolytic action.

The following three processes may be termed classic, for they have been put in practice for some years on an industrial scale.

COWLES PROCESS.—ELECTROTHERMIC.

Messrs. Cowles were the first to apply to the metallurgy of aluminium the principles of the Siemen's electric furnace. The dissolved and reduced alumina with a current in the presence of carbon. The latter in combining with oxygen develops a quantity of heat inferior to that of the formation of alumina, and could therefore never have reduced that oxide without a calorific energy superior to that evolved by its own combustion. Messrs. Cowles, at their works in Cleveland, Ohio, in 1885, did not manufacture pure aluminium, but its alloys, the aluminium and silicon bronzes. The installation comprised a steam engine of 125 horse-power, which actuated a dynamo producing a current of 1500 ampères at 50 volts. This was indeed only a field of experiment, for since 1886 there has been working at Lockport, near New York, the Cowles Electric Smelting and Aluminium Company for the manufacture of aluminium. Their works enjoy the use of a fall of water equivalent to 1000 horse-power, electricity is produced by a Brush dynamo with a current of 3000 ampères at 50 volts, and there are 18 furnaces.

The Cowles patents have been worked in England by the Cowles Syndicate Company, at Milton, near Stoke-on-Trent, since 1888. Their motive power consists of a horizontal compound engine of 600 nominal horse-power, and their electric installation comprises a large Crompton direct current dynamo with a power of 300 kilowatts[1] at 380 revolutions per minute. The foundry has 12 Cowles furnaces forming two separate batteries, one for the production of aluminium bronze, the other of ferro-aluminium. The current is brought into the foundry by two aërial conductors formed of copper bars, on which circulates a rolling contact. To each bar is attached a lead, one going to the positive

[1] One kilowatt = 1000 watts or practical units of electrical power.

electrode, the other to the negative; the moveable connection consists of a 5-strand cable, each strand of 13 copper wires of ·28″ diameter.

The Cowles furnace is as represented in Figs. 1 and 2. To charge it the electrodes are first fixed at their maximum distance apart, and the hearth is prepared. Charcoal dust, pulverised in a mill, and afterwards mixed with lime-wash and dried in a stove, is then rammed down to a thickness of six or eight inches. This preparation prevents the charcoal from too rapidly turning into graphite under the action of the current and becoming a conductor. An iron mould, to make a cavity for the charge, is then placed in the centre and surrounded at a

Fig. 1.—Cowles Furnace.
Longitudinal Section and Elevation.

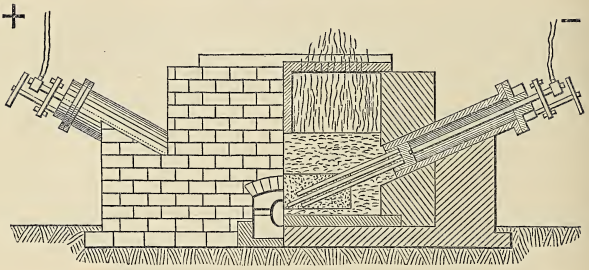
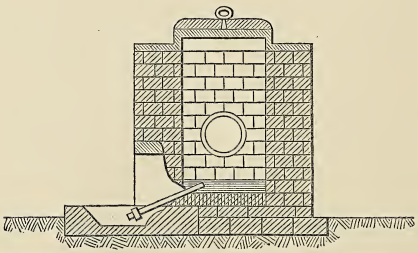


Fig. 2.—Cowles Furnace.
Transverse Section.



distance of about a quarter-of-an-inch with the same mixture of charcoal and lime. The mould is then carefully withdrawn, and the electrodes introduced at a minimum distance from one another of about a quarter-of-an-inch, and the charge is placed in the furnace.

For aluminium bronze the charge consists of:—

Corundum or emery	2
Copper in bars	4
Pulverised wood charcoal	1

The bars of copper are placed transversely to the electrodes; they have been substituted for granulated copper, which by its too rapid fusion formed a short circuit. The mass of the charge is covered with desiccated sawdust, a bad con-

ductor which affords ready egress to the gases disengaged in the operation. The furnace is closed by a cast-iron cover pierced with two holes, and the edges of which are cemented to exclude the air. To connect the furnace with the circuit the moveable leads are brought up, and the lower ends of each fixed to the extremities of the piston rods of the electrodes, when the arc springs across the charge.

The circuit includes a rheostat to regulate the strength of the current, which is read upon an ammeter under constant observation. First the copper melts, the resistance diminishes, and the current rapidly increases; when it reaches 3000 ampères it is maintained at that point by manipulation of the electrodes and the rheostat; at this moment the electromotive force between the electrodes is 80 volts, the alumina fuses, then resolves itself into aluminium and oxygen, when the charcoal absorbs the oxygen, leaving the fused aluminium to combine with the melted copper. This state of things is maintained until the blue flame indicating the combustion of carbonic oxide appears at the holes of the iron cover; then the electrodes and the rheostat are manipulated so as to produce the maximum current of 5000 ampères with a potential difference of 60 volts. The operation is now finished, having lasted about an hour-and-a-half, and about 50 lbs. of alloy are run out.

A recent improvement gives continuous action; the hearth itself forms the negative electrode, and the positive one consists of a vertical tube in which the charge is placed; a charcoal rammer crossing the tube serves to puddle the molten mass.

The Cowles furnace produces the crude metal, an alloy of copper with 10 to 30 % of aluminium and containing silicon, which must be removed by refining; with this object the metal is re-melted with fluor spar (calcium fluoride) in a graphite crucible, then run out in ingots of about 60 lbs. Bronze as required is afterwards formed by fusion in given proportions of copper and ingots of rich alloy.

For silicon-bronze the charge is of :—

Quartz or sandstone.
Copper shavings.
Wood charcoal.

For ferro-aluminium :—

Bauxite.[1]
Scrap-iron or broken cast-iron.
Remains of electric carbons.

Same operations for these as for aluminium bronze. Seventy-seven horse-power-hours of energy are expended at Lockport in the production of 1 kg. of bronze aluminium, only 46 with the more powerful machine at Milton. The iron alloy is two-thirds more expensive. As in the case of steam engines, the electric efficiency increases with the power of the dynamo.

The Cowles process only produces alloys, of which the principal are :—

Aluminium bronze or cupro-aluminium.
Aluminium brass.
Silicon-bronze or cupro-silicon.
Ferro-aluminium.

Aluminium bronze is made with varying quantities of aluminium, the more there is of the latter the harder the alloy. It resists compression, and has a good frictional surface which makes it suitable for machine bearings. It is used in the United States Navy for the manufacture of screw propellers.

[1] Bauxite, so named from Le Baux, near Arles, where it was first found, contains about 57 % of alumina, 25 % of ferro-sesquioxide, 11 % of water, 3 % each of silica and titanium oxide, and 1 % of calcium carbonate.—*F.E.B.L.*

From 3 to 1 % of aluminium added to the above alloy constitutes aluminium brass, the hardness of the new alloy varying directly with the amount of aluminium. Here are the usual proportions :—

	Copper.	Zinc.	Aluminium.
No. 1.....	71·25	25	3·75
,, 2.....	63·33	33·33	3·33

Silicon bronzes contain from 14 to 6 % of silicon. This material is used for copper wires for electrical conductors. Ferro-aluminium has from 30 to 10 % of aluminium. It is employed in steel metallurgy, especially for the production of flawless cast-steel.

HÉROULT-KILIANI PROCESS.

M. Heroult's patent in 1886 contemplated the direct decomposition of alumina by the electric current. It was applied in 1888 at the Swiss works of Neuhausen, belonging now to the "*Aluminium Industrie Actien-Gesellschaft*," the proprietors of the foreign patents. These works are the largest aluminium works in existence. They are situated on the Rhine, near the celebrated Fall, and the Canton of Schaffhausen, has conceded to the Company a volume of water equal to 20 cubic metres a second (about 440 gallons); the fall being 20 metres, the net motive-power is about 5000 horse-power. The old horizontal water-wheels have been recently replaced by a group of three Jonval vertical ones, two of 600 horse-power and 43 inches mean diameter, and one of 300 with diameter of 28 inches. Two large Brown dynamos from the works at Oerlikon, of 200 nominal kilowatts with a speed of 200 revolutions per minute, are worked by the principal water-wheels. These machines have given as much as 402 kilowatts, with a current of 14,000 ampères at 30 volts. The third water-wheel at Neuhausen actuates a dynamo which discharges a current of 3000 ampères at 65 volts, and a speed of 300 revolutions. So that, counting an old dynamo kept in reserve, Neuhausen disposes of a total energy which may reach the figure of 1500 kilowatts.

Originally the Héroult furnace consisted of a graphite crucible heated in an ordinary crucible oven for melting alumina added to cryolite. The kathode was formed of a small crucible of conducting carbon placed within the first, and the positive by a carbon pencil immersed in the bath.

Afterwards the system was simplified by M. Héroult and the interior crucible abolished. It was soon discovered that the heating of the furnace was useless; the arc, started by the granulated copper, fused the mass, and the action of the apparatus was secured without any ancillary heat.

In 1887 M. Héroult again modified his furnace, and made his carbon crucible from the negative electrode, with a covering of fire clay, through which passed a positive carbon electrode. Copper, which was the first part of the charge introduced, was fused by the current, and this metallic bath was the kathode, the alumina and cryolite were then decomposed, the oxygen combined with the carbon of the anode, and carbonic oxide escaped through the holes of the covering clay, while the nascent aluminium allied itself to the molten copper; the cryolite gave fluidity to the bath, which was fed with rich alumina and copper. But with all this it was impossible to obtain pure aluminium. When the copper was withdrawn, the addition of alumina alone soon made the bath of a clammy consistency, and pure aluminium was as far off as ever.

There is therefore much analogy between the systems of Cowles and Héroult. There is however this difference : Cowles system is simply calorific, Héroult's is in addition electrolytic.

Mr. Kiliani, the manager of the works at Neuhausen, discontinued in 1889 the use of copper at the kathode to start the arc. He observed that the active region

of the crucible was confined to the space lying between the electrodes. Outside of that the temperature was lower, and the dissolved elements recombined. To obviate this he makes the anode move backwards and forwards mechanically, while the vat containing the bath is made to turn round a vertical axis. The anode is made of plates of carbon dust prepared in a retort, compressed and consolidated with tar, and the kathode of a block of copper under a layer of agglomerated graphite. Cryolite in powder, which easily melts, is employed instead of copper to start the arc, and pure alumina is gradually introduced while the former melts, and the charge is further fed, not only with alumina, but with aluminium fluoride; the electromotive force is from 20 to 25 volts. Neuhausen now enjoys the above improvements of Kiliani together with the fixed crucible as kathode of Héroult. Figs. 3 and 4 show the type of furnace employed, consist-

Fig. 3.—Neuhausen Furnace.
Elevation.

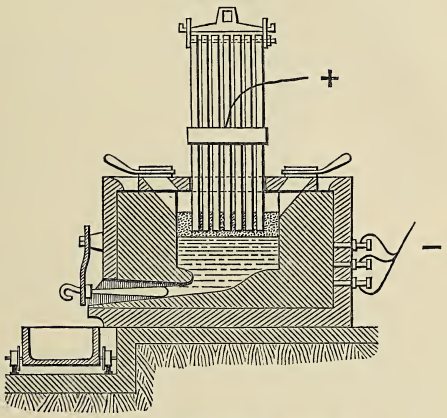
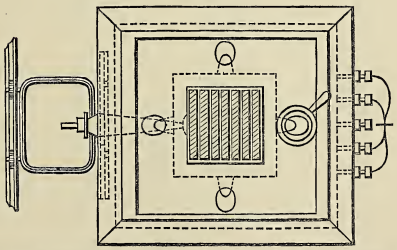


Fig. 4.—Neuhausen Furnace.
Plan.



ing of a block of compressed carbon enclosed in iron plates, as kathode; the current, brought by non-insulated copper cables, comes through terminals screwed into the plates; at the bottom of the crucible is a running-out passage, closed by a carbon plug which is held up by an external spring. The cover of the bath

has four holes, two with stoppers for the introduction of the charge, and two open as gas escapes. The anode consists of a bundle of plates of agglomerated carbon fixed by a cross-piece, to which is attached the current regulator. The upper ends of the plates are engaged in a socket hooked to a chain, which winds round a hand-worked windlass.

The action is continuous, no preparation is required; communication once established, the bundle of plates is raised, powdered cryolite is poured through the charge-holes and then the plates are lowered. As already stated, the cryolite is melted by the current, and the bath is fed with alumina and aluminium fluoride. The working is so regulated that the carbon plates shall never be more than 1·2″ above the surface of the bath. The current is now of 12,000 ampères. When the crucible is full the metal is run out into a carbon-lined mould. The addition of the fluoride has lowered the point of fusion and reduced the electromotive force from 20 to 10 volts, for its decomposition demands less energy than the electrolysis of alumina alone. About 30 horse-power-hours are required to produce 1 kg. of aluminium.

In 1891, Neuhausen turned out 200 kg. a day, about one-fifth of the total production of the world; in addition to three tons of aluminium bronze, as well as the other alloys manufactured by Cowles.

The trade aluminium produced has the following composition :—

Mark.	Aluminium.	Silicon.	Iron.
No. 0 AIAG	99·9	0·06	0·04
„ 1 AIAG	99·6 to 99·2	0·18 to 0·58	0·11 to 0·34
„ 2 AIAG	97·6 to 92·8	0·94 to 3·82	1·37 to 3·34

WORKS AT FROGES.

These were the outcome of Neuhausen. Situated in the mountainous country of Isère, at 13 miles from Grenoble, the *Société électro-métallurgique française* there enjoys a fall of water of about 580′, with 88 gallons a second, giving a net motive power of 800 horses. 200 yards lower down the stream there is annexed an electric carbon factory.

In 1889 they erected three vertical water-wheels, of which two, with a diameter of 8′ 6″, making 200 revolutions per minute, and exerting a power of 300 horses, were each coupled to a Brown dynamo of 120 kilowatts. The third water-wheel, of 100 horse-power, actuates a 2-pole dynamo having a current of 300 ampères at 65 volts; it also works the ventilators of the foundry and the machine tools.

Above are the water-wheels and the dynamos, then the aluminium furnaces in parallel distribution; in the centre is a machine shop; and below that is a foundry comprising the furnaces for the second fusion, the moulding shop, the laboratory, and the store-rooms.

Like Neuhausen, Froges at first only produced alloys of aluminium, now only the pure metal, and the alloys are obtained in the second fusion furnaces.

The furnace (Fig. 5) consists of a sheet-iron cylindrical vat about 22″ high and 24″ in diameter. The cover has two holes for admission of the charge and the anode respectively. The latter is as in the Kiliani system. Its upper end is fixed to a square-threaded screw capable of vertical motion, by means of a hand-worked mechanism of bevilled-wheels, similar to the raising movement of the tool carrier in certain punching machines. The kathode, which is a block of copper, passes through the bottom of the vat and rests in a cast-iron socket, which is filled with mercury to ensure electrical contact, while a current of water plays upon the mercury to hinder its volatilisation. Another plugged hole at the bottom of the vat allows for the discharge of the molten metal.

The charge and the method of procedure are substantially the same as at Neuhausen. In 1892, Froges produced daily 100 kg. of aluminium; for each

kg. there is an expenditure of 2·15 kg. of alumina, and from 1·6 to 2 kg. of electric carbon, one anode only lasting 20 hours. The carbon of the latter is composed of crushed coke from a gas converter, pulverised in a mill, kneaded

Fig. 5.—Froges Furnace.

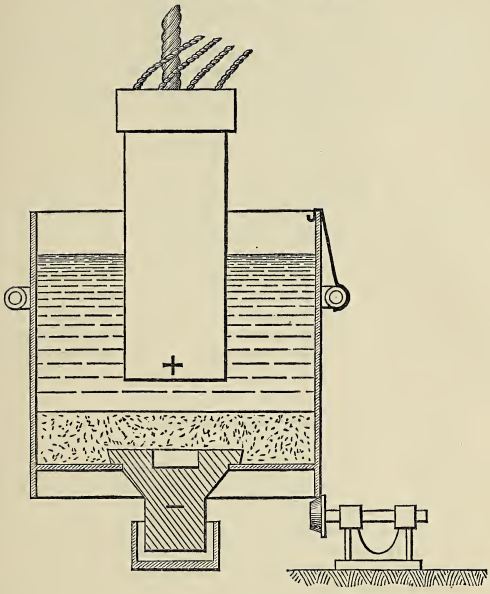
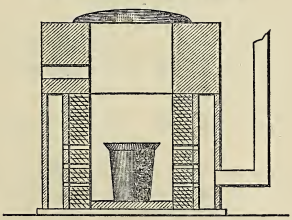


Fig. 6.—Smelting Furnace.



with 30 % of tar, and rolled into plates about 1 metre long, 25 centimetres wide and 15 centimetres thick. These are dried for four days in a stove at 300° Fahr., then agglomerated (a delicate operation), calcined in a reverberatory furnace for four or five days, and finally, when cold, sawn into two equal halves.

The aluminium obtained has from 2 to 3 % of impurities. It is refined by refusion in a graphite crucible, then run out into flat ingots which, when sold, weigh 2·4 kg., being composed of 99 % of pure aluminium, with ½ % each of iron and silicon.

This pure aluminium, added to 6 % of copper, makes an alloy of greater tensile strength than itself.

The manufacture of aluminium bronzes and brasses has now lost its importance and will probably soon cease.

Aluminium is coming more and more into use in metallurgy: it is pre-ëminently *the* reducing agent; the heat required for the production of alumina being according to M. Berthelot's principle of maximum work, more considerable than for other metallic oxides, these in their re-actions will cede their oxygen to aluminium. The latter replaces advantageously silicon and manganese in the refining of steel and the manufacture of flawless cast-steel. It also plays the part of phosphorous in bronze foundries, and in the metallurgy of nickel.

MINET PROCESS.

This is a true example of the electrolytic process by igneous fusion. In October, 1891, M. A. Minet, after trials at other places, started an aluminium factory at Calypso, two kilometres from St. Michel-de-Maurienne, in Savoy. The motive power is furnished by the torrent of the Valloirette which descends from the Galibier and falls into the Arc at Saint-Michel. The water is taken at 133 metres above the factory, and reaches the *water-chamber* by a masonry canal partly hollowed out as a tunnel. Two tubes lead from the water-chamber at a slope of 45° delivering water to the water-wheels at the rate of $3\frac{1}{2}$ cubic metres, or 9436 gallons a second, giving 4000 horse-power. There are two Hillairet direct-action dynamos of 300 and 400 kilowatts respectively. Deville foresaw the industrial production of aluminium by electrolysis, and pointed out cryolite [1] as susceptible of decomposition. He tried it with a bath composed of

Double aluminium and sodium chloride	2
Sodium chloride	1

heated to 200° Cent., but in his time the use of electricity would have been too costly as the basis of an industrial process. Minet has resumed Deville's experiments and studied the electrolysis of the Al. salts, particularly the chloride and fluoride. The latter is difficult to fuse, its point of volatilisation being very near its point of fusion, and it is the same with the chloride, only at a lower temperature. The simple salts have therefore been discarded, and double ones have been tried, with a radical more electro-positive than Al., and which would not be set at liberty before it, sodium for instance. A bath of

Double Al. and sodium fluoride	35
Sodium chloride	65

has accordingly been adopted. It is sufficiently fluid at 800° Cent., and is scarcely volatile at 1100° Cent. Its electric conductivity in terms of its temperature is given by the formula:—

$$C_t = 3{\cdot}1\left[1 + {\cdot}0022\ (t - 870°)\right]$$

As the apparatus given in Fig. 7 was not continuous in its action, the system was so arranged (Fig. 8) that the cast-iron trough itself forms the kathode, its interior being lined with conducting carbon. 10 to 12 kg. of metal are run out at a time; the strength of the current is 3600 ampères; a trough lasts about a month; 1 kg. of Al. requires 3 kg. of alumina; the metal obtained by the first fusion is re-melted and refined in a crucible. The important conditions for steady work are uniformity in the composition of the bath and of the current's strength. The dimensions of the electrodes should be therefore in direct ratio to

[1] Cryolite is the double aluminium and sodium fluoride and is found chiefly in Greenland. ($6\,Na\,F, Al_2\,F_6$).—*F.E.B.L.*

the latter, and for large currents there are consequently two anodes. The rule is

Fig. 7.—Minet Furnace.
Shunt Trough.

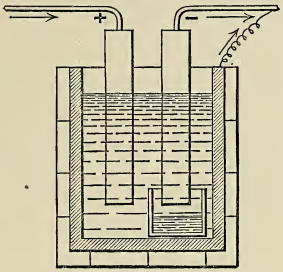
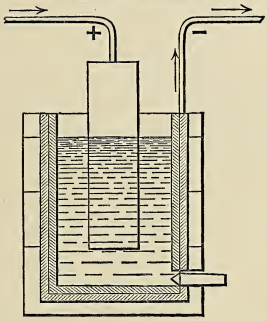


Fig 8.—Minet Furnace
Negative Electrode.



for the current's maximum strength per square centimetre of surface to be

1 ampère at the anode.
2·5 ampères at the kathode.

Let E = difference of potential between the electrodes in volts.
e = minimum electromotive force for the decomposition of the electrolyte in volts.
ρ = resistance of the electrolyte in ohms.
I = strength of the current in ampères,

then, under the above conditions we have the equation:—

$$E = e + \rho I.$$

According to Minet the resistance in terms of the temperature is as follows:—

$$\rho = \cdot 0143 - \cdot 000011\ t.$$

If the current strength exceeded 1 ampère per square centimetre of anode surface, the difference of potential would no longer be a simple function of the current—this experience is opposed to Ohm's law—but would attain rapidly a

value approximating to that of the electromotive force of the voltaic arc, about 40 volts.

The Saint-Michel factory, in addition to the metals already mentioned, manufactures a new alloy with the following composition :—

Aluminium	85 to 88
Silicon	5 to 4
Iron	10 to 7

This alloy is to take the place of ferro-silicon and ferro-silico-manganese in the metallurgy of steel. It is produced by substituting in the bath bauxite for pure alumina.

Theoretically some idea can be obtained beforehand of the most advantageous conditions of the electrolytic process, and of its result as follows :—

Let P be the actual weight in grams of Al. obtained in θ seconds, α the electrochemical equivalent of Al. in grams per coulomb, I the strength of the current in ampères, then the theoretical weight of Al. which should be obtained will be $\alpha I \theta$, and the economic co-efficient $n = \frac{P}{\alpha I \theta}$.

In practice it is only with difficulty that n can be made equal to ·8. The loss is partly due to the decomposition of the sodium salts in the bath : advantage would therefore accrue from the lowering of the difference of potential below the minimum electromotive force required for their decomposition. From the above values we obtain

(1) $$P = n \alpha I \theta \text{ grams};$$

the weight of Al. is therefore proportional to the current strength, hence the latter should be as high as possible. In practice, as we have seen in the foregoing pages, it has been constantly on the increase.

The work W done by the current in the bath is

(2) $$W = \frac{E I \theta}{g} \text{ kilogram-metres.}$$

The electrical efficiency is obtained from equations (1) and (2) thus :—

(3) $$\frac{P}{W} = \frac{n \alpha g}{E}$$

and (4) $$P = W \cdot \frac{n \alpha g}{E}$$

From (3) we see that this ratio is independent of the current strength, and increases inversely as the electromotive force.

From (4) we can calculate the weight of Al. produced by an energy in the bath equivalent to one horse-power-hour. Let us take as economic co-efficient $n = ·8$, and a weak electromotive force $E = 4$ volts, then we have the following values, taking the kilogram as the unit of weight :—

$$W = 75 \times 3600 \text{ kg.}^{1}$$

$$\alpha = \frac{·095}{10^6} \text{ (in kgs. per coulomb).}$$

Accordingly with an energy of 1 horse-power-hour expended in the bath we have

$$P = \frac{75 \times 3600 \times ·8 \times ·095 \times 9·8^2}{10^6 \times 4} = ·05027 \text{ kgs. of Al.}$$

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[1] 1 horse-power = 75 kgs. per second.
= 75 × 3600 kgs. per hour.

Faraday established the law that "the quantities of different electrolytes decomposed by the same quantity of electricity are directly as their electrochemical equivalents.—*F.E.B.L.*

[2] $g = 9·8$ metres, per sec.

and for the production of 1 kg. of Al. the expended energy would be

$$W = 20 \text{ electric horse-power-hours,}$$

equivalent to 28·8 horse-power-hours at the water-wheel. We have supposed a mechanical efficiency of 75 % at the water-wheel, an electric efficiency of 88 % at the dynamo, and a loss of 5 % by the conductors.

If, on the other hand, the electromotive force $E = 10$ volts, then the return P is only ·0201 kg. per horse-power-hour expended in the bath, and the energy per kg. of Al. is

$$W = 50 \text{ electric horse-power-hours,}$$

or 72 horse-power-hours at the water-wheel.

Theory therefore points to the necessity of employing *currents of very great strength and of low potential*. The electrical manufacture of Al. accordingly demands a considerable motive-power : for a daily production of 200 kgs. of pure metal, with uninterrupted work day and night, the total energy required will be from 700 to 800 horse-power, inclusive of the working of ventilators, crushers and other auxiliary machines. To produce daily 1000 kgs. of Al. would require a power of from 4000 to 5000 horses, which could only be obtained economically from water-power.

I extract from Ure's " Dictionary of the Arts " the following items :—

The resistance of Al. wire to tension is between that of the best iron and best steel wire.

Mr. Anderson, of Woolwich Arsenal, established that the average tenacity of aluminium bronze was 22·6 tons per square inch breaking weight. There was an elongation in one case of ·009″ with a weight of 4300 lbs., and in another case of ·034″ with 3,600 lbs.

Aluminium bronze is three times more rigid than gun-metal, and 44 times more rigid than brass.

Sir Humphry Davy was the first to produce Al., probably mixed with potassium, in 1825 or thereabouts.

Wöhler obtained it in 1827 by reducing aluminium chloride in the form of a grey powder ; in 1845 he obtained globules.

Bunsen showed in 1854 that it could be produced in reguline masses by submitting the double chloride of Al. and sodium or potassium to electrolysis. Deville produced larger globules by following and improving on Bunsen.

THE ENGLISH SOLDIERS' "RATION OF AIR".

2400 CUBIC FEET IN ARMY HOSPITALS IN INDIA.

2000 CELLS IN BARRACKS IN INDIAN PLAINS

1800 BARRACKS INDIAN PLAINS

1500 CUBIC FEET IN ARMY HOSPITALS IN EGYPT

1200 HOME HOSPITALS

1000 CELLS IN EGYPT

900 PROVOST PRISON CELLS

800 GUARD ROOM CELLS

750 CUBIC FEET BARRACK ROOMS IN EGYPT.

600 CUBIC FEET IN HOME BARRACKS & INDIAN HILLS

400 CUBIC FEET IN HUTS

Edward Wood
Surgeon Lieut Genl
1894.

THORN, WOOLWICH

SHOWING THE AMOUNT OF CUBIC SPACE ALLOWED TO THE SOLDIER IN BARRACKS, HOSPITALS & PRISONS THROUGHOUT THE EMPIRE.

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THE SANITARY CARE OF THE SOLDIER BY HIS OFFICER.

BY

BRIGADE-SURGEON LIEUT.-COLONEL G. J. H. EVATT, M.D., A.M.S.

(A Lecture delivered at the Royal Artillery Institution, Woolwich, 29th January, 1894).

COLONEL C. TRENCH, R.A., IN THE CHAIR.

THE CHAIRMAN—Gentlemen, it is hardly necessary, I think, to introduce the lecturer to you. I will call upon Colonel Evatt to commence at once.

BRIGADE-SURGEON LIEUT.-COLONEL G. J. H. EVATT—Colonel Trench and gentlemen, in beginning the lecture I would say that it was not by my initiative that I was put forward to deal with this matter. I think myself that the wording of the notice to give a lecture implies that the lecturer should himself be a master of the subject. I would prefer rather to say that we are here having a conference, and if you will allow me to be the opener of the conference I think that would be the better expression.

We are met from different branches of the army to contribute our various items of information to the one great question of how the soldier is to be pushed forward on the road towards health and fitness so that the one great thing for which he exists, namely, his fighting power in the field, may be more and more developed. I propose, then, this evening to deal with the subject in three ways : first, to glance at the sanitary history of the army briefly up to the present day ; secondly, to speak of the sanitary ideals which we specialists, in the medical service have before us for the soldier ; and, thirdly, to consider how far the Executive Commanders of the troops themselves are to co-operate in this work.

I would say that all through the last century the army was very small in point of strength. There were numbers of regiments continually being raised for special purposes, and as soon as the campaigns for which they were raised were over they were brought home and broken up. Nothing is more curious than to trace the history of our regiments to the present day ; they have got the names, and sometimes the numbers, of regiments that were broken up long before. It was not until the outbreak of the old French War at the time of the

French Revolution, and from then to Waterloo, that the army was of any great strength in England. But during all that time the number of barracks constructed was not very many, and large numbers of troops were encamped along the south coast in temporary constructions. The moment that Waterloo was fought, and Napoleon was crushed, the English Government at home set to work to cut down the military expenditure, and I think that anyone who studies the history of the army between 1815 and 1854 will say that a darker period could not possibly exist than during that time. There was a very harsh discipline governing the army, the soldiers were shockingly badly lodged, they were very badly dressed and very badly fed during the 40 years of that dark era of the service. I cannot see one glimmer of light through the whole of it, except one thing, and that was that you had here in Woolwich, in the Royal Military Academy, a military school which was keeping alive the light of military scientific proficiency. I think myself that the more an army drifts away from war experience the more it drifts away from the road to efficiency. The moment Napoleon was crushed an era of peace seemed to be quite fixed, and what did you have? You had the uniform of the army becoming an absolutely impossible one. It was the long peace that gave the bear-skin to the guardsman that he did not have at Waterloo; it was the long peace that gave the steel cuirass to the Life Guards that they did not have at Waterloo; it was the long peace that gave us the regimental contract system by which the soldier was robbed very often of his food and cheated in his clothing, and the whole of that time was a thoroughly bad time, and as the result of that wretchedly bad era there came in 1854 the tremendous crash and sufferings of the Crimean War. The whole of the modern efforts of sanitation in the army dates back to the break-up of that long peace system by the Crimean Campaign. In those barracks in the old days (and I myself have met men who remember them) the soldier did not sleep in the barrack-room as he does to-day in a bed by himself, he slept in bunks up along the wall, on shelves, two in a bed; and you can quite imagine how a conservative officer in those old days might have thought that in giving the soldier a separate bed he was making a step towards molly-coddling—a word that is most wrongly used in regard to the soldier's life. I would protest at the very beginning against the use of that word. Whenever it is used by any officer of his men, or of the soldier generally, it is sure to be by one who knows little or nothing about these men. I saw the other day that an officer of the native army in India had been using the word "molly-coddling" towards the English soldiers, and by so doing he showed that he knew nothing of the hardships and strain under which the soldier passes his life. So far from being molly-coddled, I think that just as a well-clothed and well-housed and well-fed officer goes to war to beat the soldier in everything he does, so the more we develop the soldier's fitness in peace, so far from making him unready for war we make him more fit for war. During the whole of the long peace, when the army was doing the impossible old style of drills and was going about dressed in an impossible dress, and when every thing on the parade ground seemed so beautiful in

the way of turn-out, the soldiers were dying in a wretched condition in overcrowded and unsanitary barracks. The death-rate of the splendid guardsmen in London was something painful; they were dying mainly of consumption at the rate of 20 per 1000 per year, a dreadful rate; that is to say the guardsmen were dying at double the rate of the policemen. The policeman working night by night over the city streets and doing heavy work was twice as healthy a man as the guardsman doing his duty as sentry over the various public buildings. In the general infantry the death-rate was about 15 per 1000, and in the cavalry it was somewhere about 18 per 1000, while on the nation as a whole it was only about 10 per 1000.

All this bad epoch for the army went on until the crash and disaster of the Crimean Campaign, and then the nation for the first time woke up to the question of the medical care and sanitation of the army; and a Commission was established, called the Barrack Commission. That Commission went very thoroughly into the whole question of the soldier's life and his housing; they published a report, in which they showed that the overcrowding of soldiers was most scandalous, and that their death-rate was excessive; and, amongst other things, they gave power to Medical Officers for the first time, in the year 1858, to make sanitary recommendations to Commanding Officers on all matters referring to health. Although much has been done since 1858, I desire to place on record that for 80 years and more before 1858 the Medical Officers of the Army had been struggling to develop sanitary reforms in the soldier's clothing, feeding, housing, and surroundings, but had failed to affect anything, purely from their weak official status in the army. If you read the books of Dr. Robert Jackson and others which were published last century they seem as though they might have been written yesterday, so rational, so common-sense, so up-to-date are their ideas as to the above subjects. But the medical service during that long peace had no power whatever to make recommendations, and although the regimental medical system was existing with so many Medical Officers and Surgeons in regiments they had no power to say one word as regarded the sanitary protection of the mens' health; and it was not until the year 1858 that the Royal Warrant was issued, to which I have referred, and the words of which seem to me so important that I quote them here:—"The officers of the Army Medical Staff are charged not only with the medical care of the sick, the administration of the military hospitals both in peace and war and the command of the Medical Staff Corps, but with the duty of recommending to General and other Officers Commanding, verbally or in writing, any precautionary or remedial measures relating to barracks, encampments, garrisons, stations, hospitals, transports, diets, dress, drills, and duties which may in their opinion conduce to the health of the troops and to the mitigation or prevention of disease in the army." These sentences form paragraph 8 of Part I. of the "Army Medical Regulations." They cover the ground, I think, in a very full manner; but these paragraphs were not put into the "Army Regulations" until after the break-down in the Crimean War, when public opinion had come to fortify the War Minister in doing so. But you must, of course, remember that in

England there have always been two armies, that is to say, one army worked hard-and-fast by the "Queen's Regulations," and another that rational and common-sense army wherein officers and others in the army do things in a much more common-sense manner. I have no doubt that there has never been a day when the Commanding Officer of a good type has not leaned to a certain extent on the advice of the Army Medical Officers with whom he has come into contact. I feel sure that there have been such Commanding Officers, and it would be a great mistake for any of the younger school of officers present here to-day to imagine that because the ruinous purchase system was in force and certain bad conditions existed in the old day, it did not produce many excellent and strong Commanding Officers. It would be quite unjust to think that the present men alone are perfect. Many of those officers, although they were not so scientifically trained, were men of great strength of character and had the fullest sympathy with their men; but the times, perhaps, were not so favourable as they are to-day for carrying out reforms. Since 1858 this recommendatory power has been carried on by the Medical Officers up to the present day, whether under the regimental or departmental medical systems.

The regimental system of medical aid ceased in 1873, and no doubt sanitary matters fell for a time into the background owing to the change of system in medical organisation, but whatever ground has been lost we must struggle to make good in the near future.

I beg of you to allow me to say that it was absolutely essential for the army and for us as a military body to withdraw our officers from the various units of battalions and batteries; it was absolutely essential that we should form our Medical Officers into a corps which would be ready to do war work. The whole reason for the existence of the army is not that we may have charming messes or excellent bands, or pleasant social life, be it ever so enjoyable and perfect. England has an army only for one purpose, and that is war and war efficiency. Once grant me that, and I will show you that every change which has taken place in our medical organisation was called for to achieve that aim. I would say to you, and I speak here to an audience largely composed of gunners, that when far away in the last century your great regiment of to-day was broken up into small detached groups of two galloper guns with each regiment of cavalry, and two battalion guns with each regiment of infantry, there assuredly were devoted men even in those past days who dreamt of a better day when the Corps of Artillery would take its true position in the army. If you can look back with me to that day when, in creating the Horse Artillery, the two galloper guns were withdrawn from every regiment of cavalry, I have no doubt whatever that the cavalry Colonel groaned deeply over the loss of them; and in the same way when the two battalion guns were withdrawn from all the infantry battalions the infantry officers no doubt deplored the removal and said, "They have taken away our battalion guns, they have removed our good companions, our cheery friends; look how unprotected and defenceless the regiment is left." But you must remember that behind the cavalry regiments and behind the infantry regiments was something more than all the cavalry and all the infantry. What

was that ? You had the good of the whole army to think of. What has come out of that removal of the two guns from the great bodies of the cavalry and the infantry ? You have developed this great Artillery Regiment which is able to do more and achieve more for the army than the old system could have done. I desire to say to you that evolution is working out in the same way about ourselves in the medical service. If you look back on our old medical organisation we had, as it were, in each regiment our two galloper guns, viz., the Regimental Doctors and the little tiny hospital. This weak and sub-divided service failed on the Alma hillside in September, 1854, and came to utter grief in the corridors of the great Scutari Hospital in the winter troubles of 1854–1855. Our whole organisation to-day is based on the bitter lessons learned in that sad and painful campaign. This enfeebled and divided service could not do its war work, and there is no doubt whatever that while the withdrawal of the Medical Officers from the various corps and batteries of the army has caused considerable inconvenience and trouble, you must remember that the men who withdrew them made the change solely in the interest of war efficiency and to put an end for ever to the constant dread of break-down under the old system when we went into the field. But our war efficiency once assured it is the whole object and aim of the medical service to work in absolute sympathy and perfect brotherhood with the army as a whole.

We have no hope or dream apart from its welfare in peace and in war, and we desire that every individual in the army, from the highest officer in its hierarchy to the youngest baby in the married quarters, shall be thoroughly and efficiently cared for, better and more thoroughly than in the best days of the regimental system.

But we cannot give up our corps organisation and our autonomy for field work because we exist for war, that we may have an organisation which we can go out to in the field without the feeling that there is a constant risk of breaking down. Our station hospitals are far better medical organisations than were the old regimental hospitals ; and there is no difficulty whatever in developing a perfect medical staff to care for officers, their families, and the women and children of the army if only we receive a free hand and sympathetic aid in organising this branch of our work.

If, in our devotion to the development of our garrison hospitals, sanitary work may seem to have taken a secondary place it is in no ways our intention nor our aim. We are before all things sanitarians and prevention is our watchword, and there is no difficulty whatever in carrying it out under our present unified medical system of organisation if only we determine to work jointly with the intention to succeed.

We desire to do a fuller sanitary work for the soldier than ever the best Regimental Doctor of the past system did for his regiment or battalion or battery, and it is perfectly feasible. Let us consider, then, how the medical service working as a unified corp carries out the sanitary care of the soldier's life, and what is the routine of a sanitary officer's duties. Let us take any large English or Indian garrison and study its sanitary organisation so far as we the Army Medical Officers are concerned. Although it has been necessary to remove the Medical

Officers from regiments, still we allot one Medical Officer to each regiment, corps or barracks, and he fulfils, or ought to fulfil in the fullest degree, the duties of the old Regimental Medical Officer, so far as the sanitary needs of the soldier is concerned. So far as such officers have served under me in India (or in England), I have said to him :—"It is your business to know as much about the life of the soldier, and to know everything that he does from morning until night, and, mark you, all through the night, as though you wore the same uniform as himself." It is absolutely essential that we in the medical service should know this, because we are not solely the treaters of disease; we are essentially a preventive service of sanitary specialists, specially enlisted and specially paid as the preventers, as well as curers, of disease; and it is no more possible for us to act as preventers of disease without knowing the whole life of the soldier than it would be for a great physician like Sir Andrew Clarke or any other great physician in London to treat you individually when you are ill without inquiring into every detail of your life and knowing exactly what the causes were which operated upon your health. This Medical Officer, then, whom the medical service details to look after each regiment or group of batteries should in the first place know the whole environment of the soldier and his daily life. He should fully understand the hour he rises at, the hour of his morning's stables, the hour of his breakfast, the class of breakfast he gets, the various duties he does during the day at his stables and drill; the hour of his dinner, the quality and quantity of his dinner, his work after dinner in the stables or at drill; the character of his tea, and in the evening how he finds recreation when his work is done. He should know every hole and corner of the barrack he lives in; and all through the night how that barrack is ventilated and its sanitary condition cared for; he should know exactly how the soldier is clothed, and what the rations are that he gets during the day. Those things can be taught to any young officer, and officers who have not seen the weekly diaries of Sanitary Medical Officers would be surprised, I think, to read them over. I can produce here the diary of Medical Officers doing sanitary work in this garrison, and I should doubt if there is a single detail of the soldier's life from morning till night and night again till morning that we are not trying to study and to master, because we have only one thought, namely, how best to work with you and in every way to combine with you, so that England, who looks to us both to care for her soldiers, may be made stronger by our conjoint action for the day of danger.

I say, then, that those Medical Officers who are detailed for the sanitary care of regiments or batteries are doing those sanitary inspections frequently during the week. Thus on one day of the week they would go and inspect the barrack buildings and see them thoroughly, and I always find in any garrisons where I have been in charge as Medical Officer that it is not possible for any Medical Officer to do his sanitary duty properly by the regiment if he endeavours to carry out inspections of men and barracks on one day; because if he stops for a moment to look at anything that is defective in the sanitary state of the barracks he is sure to be keeping the men in a distant part of the barracks

waiting for him and keeping them away from some important duty. I repeat from long experience that it is not possible for any Medical Officer to make those inspections of men and barracks at the same time and on a single day.

The officer then inspects the barracks and he inspects the men. Now, many of the younger Medical Officers have complained, and are complaining, about the difficulty that they experience in carrying out these inspections. The other day I saw a letter in a military paper from a Medical Officer proposing that all these inspections should be abolished, that it was impossible to carry them out, and that they were a perfect farce. On the very day that that letter appeared in the paper, on the parade of this very garrison one man was sent off parade sick with scarlet fever, out of the West Rear Range; another man was sent off sick with a disease like scarlet fever; and I myself on another inspection sent a man to hospital with jaundice. Now, why are the Medical Officers wishing to get rid of those inspections, for they are really a most important matter? It is because it is difficult for them to get proper parades of the men. They go into the barracks and they find it difficult to know to whom they should look; a parade is formed up for them in a scratch way and is often a feeble and farcical affair. I am not speaking of Woolwich particularly, but over and over again I have had to write to C.O.'s and point out that while the number of men in a corps or garrison is strong, the number on parades given to us are very weak. In the same way in going about on the sanitary inspection of the barracks one does not know to whom to look to go round with one. I say to a Medical Officer, "You are posted to the sanitary care of such a regiment. I beg you to go down and leave your card at the orderly-room. I specially want you to know the Commanding Officer socially and personally," because unless you are able to approach him socially and personally you know when letter writing begins efficiency constantly ends, and it is essentially necessary that there should be the most free and complete intercourse between the two. But if we find this great difficulty exists in the first instance in getting our sanitary officers themselves taken round the barracks by some one who is responsible and who knows the barracks, and secondly in getting a good health inspection parade of men, the whole thing degenerates into a farce, and every soldier undervalues it. "Let us, I say, most earnestly come to some definite conclusion one way or the other on this sanitary routine; either let us do the thing well or let it be abolished," because to-day, in the year 1894, the question of half-and-half measures and compromise is coming to an end in everything, and we in the medical service want to know how our duties stand, and what they are, and we desire to do them if we are really responsible. In a certain station abroad that I have got in my eye, I went to the Commanding Officer of a regiment in the garrison and I said to him, as the senior Medical Officer of the station, "It is my interest and yours that we should both work together. I will give you an officer who will make your regimental inspections, but I beg you to give him a responsible officer to go round with him." I said then, and I say still, that I do

not consider that the officers who fill the post of Quartermasters are the proper people for this work; they do their work in the best possible way, and we could not get on without them; but I maintain that it is essential in the sanitary care as in the governing of a regiment that an executive officer, the representative of the Commanding Officer, should meet my officer, and that the inspection should be made conjointly, so that the reports that are made shall reach myself and the Commanding Officer straight and direct. The Quartermaster represents not the executive side, but an important administrative side if you please; but the command of English soldiers which, mind you, implies much power in our army, also implies great and most serious responsibilities; and, therefore, throughout my service at home or in India I have endeavoured in the regiments I was mixed up as senior Medical Officer to get a Subaltern Officer as well as the Quartermaster to go round with my Medical Officer at these inspections. The result has been in every way excellent. You can get the work done well, and it is astonishing what a different thing sanitation becomes under such a condition. The sanitary inspecting officers then, of the various batteries or regiments, make out their weekly reports of the sanitary inspections made on the Friday and Saturday, and, on the Monday morning, I myself had when in India and have every week here, a regular sanitary conference with the sanitary officers serving under my orders; that is to say, I meet all the Medical Officers of those regiments, and there is no sanitary question or shortcoming so far as my lights go (and I have had 29 years of a soldier's life) that is not fully and freely discussed, and I read over the diaries. If anything has gone wrong I say, "Have you written about this to the Commanding Officer?" The Medical Officer replies, "Yes, I have." "Then bring me the reply; what is it?" And I would say to officers commanding the various units that when Sanitary Medical Officers write letters to them, of course, they look for an answer; but very constantly we wait and no answer comes. I have found the matter so difficult to deal with in some most sickly stations that I have been at, that I went to the trouble of getting a form printed, saying at the bottom, "Will you please favour me with an account of what you propose doing in this matter so that I may fill up my own sanitary reports." I think such a sanitary report form much needed in our army.

Having read the letters and the diary, I advise with the officers as to the course to be pursued. Should the Commanding Officer write back, and say, "I regret to say I am unable to carry out your suggestion on account of so-and-so;" then the matter, so far as it lies between those junior sanitary officers and the Commanding Officer, ceases; it passes to me then, and I myself write to the Commanding Officer of the regiment pointing out the necessity of such-and-such a suggestion; and when he replies, if it is a senior officer writing to me probably he may modify his opinion and the thing may be done, or he may reply, "I regret I cannot see my way to carry out the suggestion." Then the matter ceases between him and myself. I then write a letter to the Principal Medical Officer pointing out that I have addressed Colonel so-and-so as to the fact of his taking out the men at such-and-such an

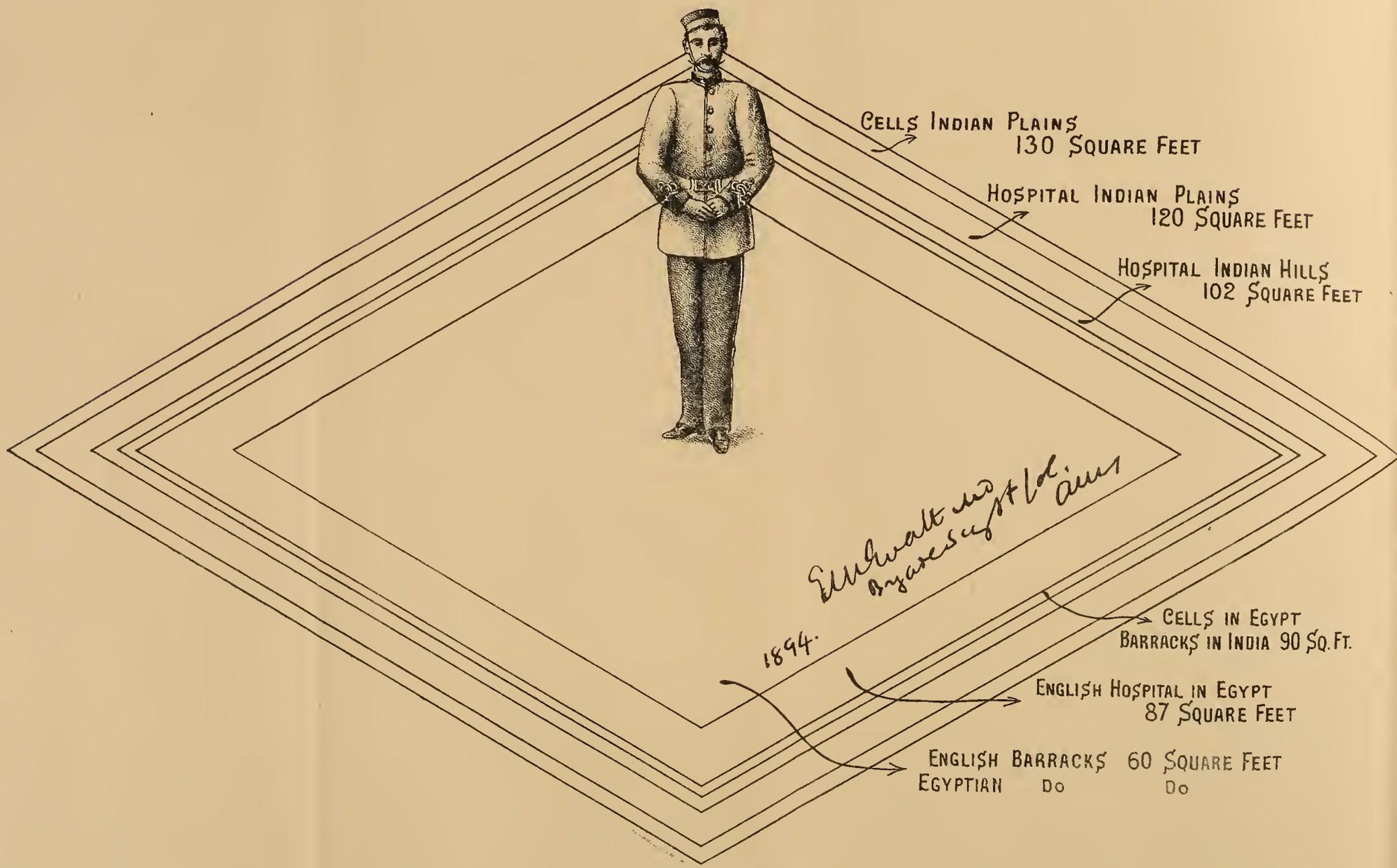
hour in the morning and keeping them out for such-and-such a time, and then the men coming in swarms to me sick in the evening because they have had no food or no proper food, and that it causes me great trouble; that I have requested him to consider the matter and asked him if he could modify it, but that he says it is not possible; and then I beg the Principal Medical Officer to consider the matter, and if he concurs with my views I beg him to move the General Officer Commanding whether he can order the Commanding Officer to do so-and-so. Then the matter passes out of my hands and lies between the District Principal Medical Officer and the General Officer, and they discuss the matter. The General Officer may concur and order the suggestion to to be carried out, or may not concur and the whole matter falls for a time into abeyance. These recommendations may refer to any possible matter in the wide range of sanitary duties.

From the various weekly returns compiled by the Sanitary Medical Officers and myself the Sanitary Officer of the garrison makes out every quarter a quarterly sanitary return dealing with every possible sanitary and health question; referring to the healthiness of the barrack-room, the overcrowding, the water supply, the latrine arrangements, the clothing, the drills, the cooking, the food, and everything. And this report, together with the remarks of the Principal Medical Officer of the District, go in one report up to London to the Director-General of the Medical Department, and the latter then, as head of the medical service, considers the reports with his sanitary staff in London, and advises the Commander-in-Chief as to what he considers should be done. At the end of each year a Blue Book is published, dealing with the health and sanitary condition of the army, and this is sent to the War Minister, and by him printed and presented to the Houses of Parliament. It embodies the statistics of the sickness of the army and the sanitary reports of the Principal Medical Officers of Districts; but I do not see in this Blue Book the final opinions of the Director-General of the Army Medical Department on the health of the army as a whole. The Blue Book contains the reports of the Principal Medical Officers of the Districts throughout the Empire, which the Director-General simply embodies and forwards on to the War Minister, and that official to Parliament. I think myself that it would be a great thing if it were possible that the Director-General in London, who has the enormous benefit of receiving the reports of the Principal Medical Officers all over the world, should give a summing-up on the various sanitary matters that are put before him for the information of Parliament. This is an outline, I say, of how the sanitary side of the army works as regards its organisation from the sanitary officer of a battery up to the Director-General and the War Minister.

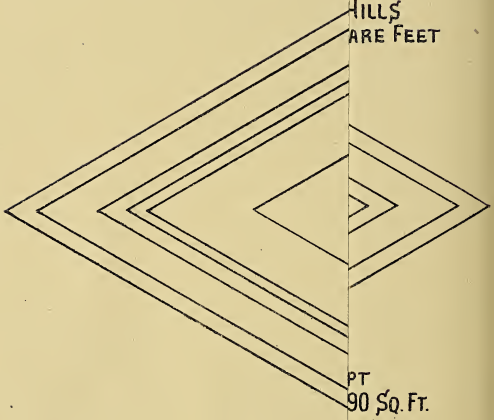
I would now come back from these general remarks to the absolute details of sanitary matters. Let us begin with the barrack accommodation of the soldier. I told you that in 1858, after the break-down in the Crimean War of 1854–55, a great Commission sat, called the Sanitary Commission, and made certain recommendations. They made a recommendation that every soldier in barracks should be allowed 600 cubic feet of air space. They found when they examined the barracks

at Chatham that the proportion allowed to each man was only 300 cubic feet, and they made the recommendation that each soldier in barracks should receive 600 cubic feet, and that ventilators should be placed in the room which would allow the air in that 600 cubic feet of space to be changed twice in one hour, so that a soldier might be able to receive 1200 cubic feet of breathing air in the course of one hour. Now, why was this asked for? Was it by a fluke or chance? I say that I can no more modify my opinion as regards the cubic space for the soldier than any gunner here can modify his opinion as to the thickness of the parapet as regards the penetration of his shot. It is governed by a law. A human being to breathe healthily and well requires 3600 cubic feet of air in the course of an hour, and the total "ration of air" that the soldier now receives from the country is only 1200 cubic feet per hour, that is to say, far and away below the normal average of a healthy man. The result of the old overcrowding of barracks was always that it resulted in consumption, phthisis. This consumption, this destructive lung disease, was caused by the overcrowded men breathing in and out this poisoned air into the room and poisoning the air with carbonic acid gas; and, furthermore, and much worse, by pouring out of their lungs in the course of every day 30 grains of organic matter which is the waste material of the body. This poisonous atmosphere, which, mind, will poison an open wound if exposed to its pernicious influence will cause a strong healthy man to sink into ill-health and give him consumption, and did in the old day kill off the splendid ante-Crimean guardsmen at the rate of 20 per 1000 per annum. Put yourself, then, in our position as medical officers, who all of us know this, and who are taught at Netley the danger of this poisoned air, and say how can I be silent, or how can my officers be silent, or how can you expect me to be silent and not write and point it out when anything like overcrowding occurs? I say that if I was to be negligent or silent I would be as much a traitor to the efficiency of the army as that officer in command of an outpost who sees the enemy approaching and is such a poltroon and such a traitor as not to report it. To us in the medical service, who see the evil results of overcrowding, there is an enormous force driving us onward in the sanitary struggle for the soldier. It is not that we may be more humane or more philanthropic than other officers, but if I stand in a garrison every morning and see the whole sick of that garrison pass through my hands and hear from every individual private soldier the reason why he is sick and why he has fallen ill, and if I hear from every soldier's wife the reason why she is ill, or her child is ill, I say that the force acting upon me is an enormous and irresistible force. This is the force, then, which is driving us to write and work and, perhaps, bother you in the middle of your work for the soldier's sake. An officer, who may be a keen gunner and who believes absolutely in his guns and horses, may, by reason of his very keenness, forget for a time that behind the gun is the man who works the gun, and riding the horse is the man who is 10,000 times more valuable than the horse. The man is our care, and we, hearing his story and seeing his condition, are perpetually urged forward on the pathway of sanitary progress for his sake. We are

Sketch Showing Superficial Space Allowed to the English Soldier.



SKETCH SHOWING DIER.



urged forward, then, not only by the actual breakdown of the soldier's health, which we see for ourselves, and by the reports of the soldiers who are actually our patients who tell us the reasons of their illness, but constantly the medical service is being made use of by officers of rank and standing to urge forward improvements or recommendations which they themselves hesitate to put before the authorities. How often have I said to such an officer, "You are using me to put this matter forward; why not represent it yourself? You have rank, standing, and position; why come to me?" He will reply, "The medical service is independent, able to speak, and unless you assist we cannot succeed." I maintain, then, that General or even higher officers in high command, when they receive recommendations or suggestions from the medical department, may be, and often are, entirely unaware of the real sources of the recommendation.

The more hard or unyielding the General, the more is the medical service used to move him. How clear, how definite, how unassailable, should be the rank and status of the sanitary officer liable to the pressure of the upper and the nether millstone in the clear discharge of his duties to the army. Surely he forms a definite part of the army that cannot with any sense of justice be put aside. We in the medical service knowing this responsibility, knowing these heavy duties, knowing the various unseen currents acting upon us, and placing us in direct prominence as sanitary officials speaking for the good of the army as a whole can never cease to claim defined and unassailable military status, not merely for our own personal sake, but for that army who in every rank, from the highest to the lowest, are at times compelled to have recourse to our assistance.

The army does not want a body of weak-kneed, trembling Medical Officers with defective status and shaky rank, but rather a highly-trained and thoroughly disciplined and independent body of sanitary advisers in deep sympathy with the army as a whole, and bringing all the help of modern scientific investigation to bear on the preservation of the health efficiency of that army which, scattered over an enormous Empire, is fighting a trying battle with disease and death in peace and in war wherever the English flag is flying.

Let us return now to purely sanitary details. The Sanitary Commission in 1858 fixed on 600 cubic feet of air space for the soldier, and they put in ventilators which enable this air to be changed twice within one hour. There is a law governing the size of the openings of the inlet and outlet ventilators which enables a certain fixed amount of air to come into the barrack-room, and these give the soldier his definite "ration of air." The air of the average badly-ventilated barrack-room about 3 o'clock in the morning can become almost poisonous, and a horrible odour of organic matter from the soldier's body and bad air from his lungs can and often does produce a thoroughly deleterious atmosphere. It is as necessary to have a good system of ventilation in a barrack-room so that the air may be changed, as it is necessary to have the barrack latrine outside flushed by water. This flushing with fresh air called ventilation is wanting to sweep away the poisonous organic matter so as to make the room sweet and fit for the soldier to

live in. For whose sake? For all your sakes. And why? If the soldier sleeps for eight or nine hours in that bad atmosphere, when he rises in the morning he is in a semi-poisoned state, he does not feel fresh and fit for work, and what is the result? he looks about for drink as a stimulus, the soldier after a long night in that bad atmosphere, stupified by bad gases, may also be below par in a nerve sense and be in a bad temper—that is to say, he is not fit and well as he should be. The difference of good and bad air in its action on ourselves is very well shown by the depressed state in which we feel ourself on an Indian troopship when coming up on deck in the morning from the stuffy cabin below stairs where we may have passed the night and the feeling of freshness and elasticity we feel after sleeping in some well-ventilated Indian tent: in the one case we are in good temper and fit and fresh for work; in the other case we are below par and unfit for work. Why? Because in the troopship we are semi-poisoned by the poisonous gases and organic matter given off by the hundreds of people in the crowded 'tween decks below and which drifts back into the officer's cabin and into Pandemonium. The soldier, then, has a fixed and definite ration of air allowed him by the State. Just as he is allowed a "ration" of money called pay, and a "ration" of food, and a "ration" of clothing, and a ration of water in the tropics to sustain his existence, so he is allowed by the regulations a "ration of air," and there is no more legal right to take away from him that defined ration of air by overcrowding him than there is to take away from him his pay, his food, or his clothing allowances. We must never forget also that the ration of air of the soldier is in no sense a full ration. If I were to sit down in a physiological laboratory and deal with the ration of air in a purely scientific and abstract manner I would then say that on purely physiological grounds he requires 3600 cubic feet of air per hour to keep him healthy and fit. The Sanitary Regulations, which were framed in 1860, and which still govern the army, were only tentative, and as the official wording goes, "Only for the present time (1860)" only give the soldier 1200 cubic feet of air per hour; therefore he is to the bad the difference between 1200 cubic feet and 3600 cubic feet per hour. In those bygone days, so wrongly called the good old days, the terribly overcrowded state of the men caused the dreadful atmosphere of the barracks, bringing about air poisoning and ending in consumption. While the deaths in the civil population of the military age (20 to 40) were 10 per 1000, in the splendid cavalry of the line they were 18 per 1000; in the regiments of Foot Guards they were 20 per 1000, and in the infantry of the line 15 per 1000, as against 10 per 1000 of the same ages in the civil populations. That is to say, this elaborately turned out, heavily pipeclayed, and absurdly dressed soldier of the old pre-Crimean day was dying of practically preventable destructive lung disease, and the army medical service up to 1858 had no power to say one word of advice or warning in this most serious death-rate. In those bad old times it was an often quoted saying of old school Generals that the opinion of the military doctor was valuable when it was asked for, that is to say no sanitary initiative existed for the doctors. Since 1857, however, this power of sanitary suggestion has existed,

and with thoroughly sound results. In studying the above death-rates of the army we should note that consumption caused 67 per cent. of all the deaths in the Household Cavalry during the pre-Crimean period, 50 per cent. of the deaths in the cavalry of the line, and 57 per cent. of the deaths in the infantry were from consumption, a probably preventable disease caused or greatly developed by overcrowding in the barracks. At the present time the death-rate of the Guards has fallen from the 20 per 1000 per annum, that bad standard of old years, until, in 1890, it has fallen to 9·88 per 1000, and you will find in the A.M.D. Blue Book that in the year 1891 the report shows that the death-rate of the army has fallen to 9·13 per 1000. What is the cause of that? It is, I think, largely caused by the better space and the better sanitary conditions and environments that the soldier is living in, and these results have been largely owing to the sanitary advice of the medical service acting in preventive capacity as the preventers and not merely the curers of disease. It is in the discharge of this duty that the greatest moral courage and independence of character is needed. There is nothing more easy and charming than to go to a great hospital and to work there; no one interferes with you and you may make yourself a great name. I may serve in a far away garrison in India and may make a great name by treating the 50 or 60 cases of typhoid that occur in the year, and may be much thought of and honoured. There is a better way to make a great name. I say that if my child is ill and there is a doctor close by who can cure him of diphtheria he is a good man; but the doctor who prevents the attack occurring is a better man. That military doctor who, knowing the soldier's sanitary wants, his water supply, his clothing, and his food, and his surrounding, and who seeks the reasons why a man is getting sick with typhoid is a more useful man to the nation and the army, and a better man than the other, however good he may be. You want in the army as a Medical Officer the man who will give you in the battle 10 more men to your battery or 100 more men to your regiment. Is that the case or is it not? It is most certainly. I say that the sanitary side of life is of great importance. You may read in the military papers letters which say that the military doctors should be what they call a doctor; they think and talk as if in England there were not more than 1000 doctors who do no curative doctoring whatever in the way of prescribing for the sick. But the 1000 doctors in the public health service of England are most masterful men, and have far greater authority as regards the inspection of food supply and the sanitary condition of the people than we have in the army. These physicians are just as much doctors as the others, but they are dealing with a different side of the question of life and its ailments, viz., with the question of prevention of disease; and for you in the army it is of great importance that you should not get in the military service weak-kneed and craven men afraid to speak on sanitary matters, but men of rank and standing who would be able and willing to speak out and point out the path to sanitary improvements.

The army death-rate has thus fallen largely by going into sanitary matters, and that you have benefited by it, by having men in your

ranks of the army healthier and readier to go to war. Short service, no doubt, has also to be considered as a factor in this matter. While the death-rate has fallen and invaliding has fallen, it must be remembered that the soldier to-day stops with us but a short time, and the health returns may, perhaps, be vitiated somewhat on that account. I came home last year from India in a crowded Indian troop-ship, and I saw that point very marked. Many of the men there were not invalids officially (nor did they appear in any invaliding return), but they were no more fit to go into the English labour market and compete with healthy English labourers than any of us coming home seedy with ague would have been. Their unfitness was entirely owing to Indian climate, although it figured in no return. They had not, however, re-engaged. Many said to me, "It is too much bother to re-engage; I am constantly getting ague and feeling seedy, and I am going to the reserve." In the old days when I joined we kept those men and they could not get away, in fact there was no chance of getting away except invaliding, whereas now men simply do not re-engage.

This question of bad air and overcrowding of barracks is of the greatest importance for this reason. Impure air goes directly into the lungs, but bad water may be killed in the stomach; I may drink bad water and the juices in my stomach may kill the bad water, and I may survive. It is well known that 2000 persons in a large church or building will in two hours give off 17 gallons of water, and as much carbon as would come from one cwt. of coal. That is not a very pleasant atmosphere if it is not constantly changed. Do not forget also that 30 grains of organic matter are given off per man per day from his body in the shape of worn-out skin and *débris* of the body. The smell of the men in barrack-rooms may be very unpleasant and most trying, altogether caused by the closeness of the men and the want of fresh air. And that affects the men's health and discipline. You must remember that the barrack-room is not only a dormitory; the men are eating and drinking and sleeping in it, brushing their dirty boots in it, brushing their dirty clothes in it, pipeclaying their belts in it, and smoking in it, too, and the air can become very vitiated from all that. In dealing with the question of overcrowding, then, we have got to bear this in mind, that we are dealing with a fixed law which we should recognise very fully as to the danger of interfering with the cubic space allowed to the soldier, and I trust that whenever letters come to you on this matter that you will receive with great consideration any suggestions with regard to any question of overcrowding.

It is very needful we should speak here about the question of urinals. There is still in all the barracks in England, or in most of them, this horrible urine tub—that is to say you have a horrible looking thing, a wooden tub; of all things most highly absorbent, which is supposed to be tarred every quarter, and into this the men urinate. I must tell you that no light is allowed at night by the regulations for this tub; the soldier comes out of the barrack-room on to the lobby, there is no light, and the consequence is (and we may see it in most barracks) that the ground round the urine tub is constantly saturated with urine. And a

case has occurred, I think, even in this garrison where the urine has gone not only on to the floor, but through the floor, and has come out on the roof of the room below. A case occurred before my eyes where a soldier on the inner side of the room was sleeping with the head of his bed against the wall where the urine tub was and the urine soaked through, and he complained, and I think justly, of that urine oozing out towards where his bed was. Those questions are very important. We want, in the first place, light at night over the urinals, and we want regular urinals built as you see them at railway stations, and attached to the buildings with water flushing them and light over them, where the soldier can urinate without soiling the floor and tainting the air of the barrack passages. Why should railway stations and other places beat us in civilisation? I think we can get these urinals if we jointly push the matter, and we mean to do it; we will push away at this urine tub and get something better for the soldier. Even an iron bucket would be better than an absorbent wooden tub.

My next point is about bath-rooms and lavatories. I could not exaggerate to you the defective condition as regards cleanliness of the person of our soldiers. No one sees as we in the medical service do the absolute filth of the soldier's person. A man comes up before me well dressed and well turned out, but he is a whited sepulchre; the condition of his person and the odour that comes from him are very unpleasant. What is the reason? The reason is that the regulations only allow one per cent. of baths for the troops, that is to say that for every 100 soldiers only one bath is allowed; and they allow 12 basins per 100 soldiers and four foot-baths. But you must remember that the soldier is not allowed any warm water to wash with. I cannot tell you what an important matter this is. This odour, this *ésprit de corps* in the very worst sense which comes from the body of the soldier is most offensive. If anyone will come over to the Auxiliary Hospital in the morning you will have a smell like the odour of a troop-ship in the Red Sea. Now, all that arises from preventable causes. We want warm water laid on most awfully. I maintain that from the 15th of October to the 15th of April all bathing ceases in some garrisons, and the body of the soldier is not washed at all. That comes before us doctors in the most striking way. I have to examine a man's chest and the odour is most trying. Remember the cubic space is based on the clean man; but you have this man going to bed in the barrack-room with his body not washed, so that the air becomes offensive and tainted, and this affects the health, the fitness, and, in the end, the discipline of the soldier. As you know in this garrison here during the past few months a great improvement has been made that is to say that by efforts of Colonel Spragge warm water arrangements have been placed in five groups of barracks, and I had an opportunity the other day of totalling up the number of baths taken. I beg of you not to say that soldiers will not do certain things, for I find that between the end of November and the 13th of January in this garrison 1200 warm baths were taken in one of the five groups of barracks alone in the baths quite lately put up. And those baths, mind you, are worth in the town 6d. each. What is going on round the barracks

here? Every possible religious denomination is going in for baths for the soldiers; you can get a Church of England bath, or a Wesleyan bath, or a Unitarian bath, you can get all kinds of religious baths, but no State bath. But the State is bound to wash the soldier. A devoted lady, devoting all her time to the soldier, said to me the other day, "We do so much want a bath!" She suffered very much from the odour of the soldiers in going amongst them. Now, we must do away with all this bathless condition. My own view is that we cannot provide little trumpery bath-rooms in very small groups of barrack-rooms, but just as the Municipality are building public baths there should be in every large barracks a separate bathing-house in which men could have plunge baths and wash and bathe themselves thoroughly. I would ask any gentleman going round the town here to go to the public bath buildings opposite the Town Hall, and I maintain (I do not care what his views are about baths) that he will be surprised at the municipal baths of Woolwich, they are splendid; the Municipality of Woolwich are laying out £40,000 to wash the Woolwich people, and you would be surprised—I maintain whatever your dreams are they will be exceeded. There are two magnificent plunge baths into which you might put, I will not say an ironclad, but a very large vessel, and there are exceedingly good first and second-class baths which provide everything that is wanted. If a soldier is in the army where he cannot express an opinion and has no vote, it is necessary for his officers to put forward this matter thoroughly for him, and to say that it is affecting the recruiting of the army; that better men will not come to us because of these things. If a man outside in civil life can go to the municipal baths, he will look upon the army when he comes to it as below a healthy standard. You must advance as the civil population are advancing. Look at Plumstead. You see house after house by hundreds built for workmen who a generation ago were living in single rooms, as 80 families of our own live in Woolwich. We have to-day 80 families living in 80 rooms, each family having but a single room. Then, I say, the baths have been thoroughly appreciated, and the result of our inspections on the Saturday is very marked. In one unit particularly I was charmed with the cleanliness of the men. I think I told an officer here about it, that their feet were so clean that they could have been used as ornaments for a lady's table. You come and say to me, "Oh, but they will not care for them; they will not use them." *But they will do much if only we teach them to do it.*

I would say a word here on married quarters. I have said already that we have 80 families here living in 80 rooms, each family having but a single room. The new regulations from the Quartermaster-General's Department, about married quarters, seem very reasonable and very just. Quite recently I had the pleasure of going round the newly-built married quarters, and there is in them a great improvement in space and comfort. I think they quite satisfy the dreams of the most idealistic man. The whole system of married quarters is an evolution. Formerly the wife was not recognised at all; then she crept into the barrack-room and slept there, with a sheet or blanket put across to screen her from the soldiers. This was in the good old days, which

were really the bad old days; then she moved out of that, and then they gave up the barrack-room to four or five families; that existed in my day, in Chatham, in 1865. Then they went from that into a single room built as married quarters. Next year when they will go into the New Brookhill Quarters, and I think the demands of the most exacting sanitarian will have been met for the time being.

We have spoken about the percentage of baths, one bath being allowed per 100, and four foot-baths per 100; but the soldier has also the right to go to the latrine. But it may be full at times, and I have seen great trouble in that matter. What accommodation do the regulations give to the soldier in that respect? They allow five latrine seats and five urinal spaces per 100 men! The question came before me the other day, and how did I find it out? I searched book after book, and suddenly by good luck I came across a most valuable book, I will tell you the name of it; it is called "The Synopsis of Barracks and Hospitals," and it is kept up in the Commanding Royal Engineer's Office. I maintain that there is no book that I know of that ought to be more in the hands of Commanding Officers. I have not got one, the Principal Medical Officer has not got one; not a single officer has got one, and I do not know who has except this one copy in the Commanding Royal Engineer's Office. This gives us all details about the baths and latrines; it is not in any of the regulations. We have volumes of military books, but this very vital book is not there at all. I would say that the Government or the Military Authorities would do well by publishing this book; it is not anything confidential, it is the number of baths and basins, of latrine seats, and the amount of cubic space, and many useful things about hospitals. I was thinking about blinds for my hospital and how I could approach the Commanding Royal Engineer, when I found in this book that blinds for hospitals are allowed, and at once I applied for them. But we do not want to be fighting these kind of questions all over the Empire; we ought to have this book given us. I applied officially, through my superiors, to get a copy, and the reply was that this book is only supplied to the Commanding Royal Engineer. It is the family secrets, as it were, of the Royal Engineer Corps. Why, I do not know, as it is needed by the whole army. I hope it will be made an official book.

The question, then, of latrine accommodation is important in this way, that last year in India (and when I think of the charming young officers who have died in India it is most sad) we had 1380 cases of typhoid amongst the young soldiers in India, and we lost by death 380 of the Indian garrison by typhoid alone. The question, therefore, of the removal of latrine matter is a most important question, and you must not look at these questions as beneath notice. I cannot tell you how painful it is sometimes to go round on a barrack inspection. You come round by the Principal Medical Officer's direction. The Medical Officer goes to inspect the barracks, and who goes round with him? I have myself gone round with the Quartermaster, and have been met by a casual Subaltern, who looks upon the whole thing as a very great bore perhaps, and when you go to the latrine this Subaltern stands aside and the Quartermaster and the Doctor walk in. Believe me,

gentlemen, that "command" includes the latrine also. If you look the matter in the face there are lots of men in the barracks standing looking on, and if they see the officers stand aside they say it is not of the least importance. Now, I maintain that it is of great importance. Here again, I say there are two armies : there is the army of the "Queen's Regulations," which is kept tight and hard by the regulations, and there is the rational common-sense army. In the army of the "Queen's Regulations" a Captain or a Subaltern takes the Principal Medical Officer round; but there is another common-sense army, in which the Commanding Officer himself goes round with the Principal Medical Officer. Believe me, that the Commanding Officer, just like the Irish landlord, has his duties as well as his rights. You must remember that your command is supreme, and when the Commanding Officer goes round with the Principal Medical Officer the result is enormously good. The Subaltern does not know much about these things, but the Commanding Officer is responsible to the army and to England for all these things. I maintain that it is absolutely essential; it is not a question of rank, but is of great importance to the soldiers.

I would like to say a word here on the question of the soldier's bedding. The soldier is allowed 24 lbs. of straw per quarter, and with this he makes the bed and bolster, no pillow is allowed him. I have brought with me here to-night the two sheets which are used in the army; I think it will be instructive for you to see them. One is the hospital sheet which is used by the soldier in hospital, and the other, which anyone might imagine was a piece of navy canvas, is the soldier's barrack sheet, it is a piece of canvas which has come here by mistake, and is called a barrack sheet. We are now pursuing the reasons why the barrack-room smells. The soldier does not wash; the men are lying there close together; the ventilation may be interfered with. But we now come to the bedding. The bedding is of straw and he gets two sheets. How often are they changed? They are only changed once a month, and the condition of those sheets, when they are used, becomes something very marked indeed. A soldier, mind, who does not wash, and whose body is not always clean, is lying for one month between those two pieces of canvas, and the result is very trying. I maintain that we might go to the country with a cry of a fortnightly washing for the sheets; and it would be a great comfort to the men. But you must also remember that if you give this coarse kind of sheet to the soldier he will not use it at all, and I find that only about one-fourth of the men use their sheets; the rest of the men turn in in their flannel shirts. And in the artillery where they have got drawers they turn in as they come out of stables. A man goes to the stables, where he works all day and sweats hard (because your drivers work very hard indeed), he comes out with his drawers and shirt soaking in sweat and turns in and lies in this sweating condition in the blankets, and the blankets are washed only once a year and the sheets once a month. This man comes before me the next morning at the Auxiliary Hospital, I strip him, and he comes out of his flannel shirt that he has been sweating in for a week, and he puts off from his clothes a small portion of horse manure that comes out from between his waistcoat and his

flannel shirt—that is to say, the man has turned in and has not changed his clothes in any way. And we want to look into those questions.

What, then, is done with the sheets? They are used sometimes to put over the saddlery; constantly to tie round his waist to keep him from soiling himself when he is doing up his accoutrements; they are constantly put under the pillows and beds simply for safety and not used at all. The soldier says, "Why, sir, use the sheets! I would as soon use a piece of coir matting;" they also complain that the sheet is so rough that it wears out the flannel shirt which they are wearing as soldiers. A specialist in sheets told me he thought the soldier's sheets would make excellent bath towels.

Then a soldier marries, and among other boons that he gets is the right to use the hospital sheet; every married soldier gets a pair of hospital sheets once a month. I asked a married woman how often they were washed, and she said, "Once a week." The police have their sheets washed once a week, and so do the paupers in the workhouses, but the soldier's sheet is only washed once a month. In Egypt they are washed once a fortnight. In India the soldier gets two sheets given to him when he arrives out, and one sheet a year afterwards, and as there he is allowed to wash them at his own expense he washes them once a week. Then, as regards the straw pillow, or bolster rather, I find that the old soldier, the man who really likes comfort, always travels about with his own private pillow. And the married people never think of using the barrack beds; they have their own private mattresses, and they use the straw below them to make them softer. But I find that in some garrisons, such as Aldershot and Portsmouth, they have issued a better bed, a coir bed, which makes a capital bed; it is used in India. The Government allows there a coir bed and it makes up a very good bed, and the men tease the beds themselves and wash the mattress case. There are 2000 of them now lying down in the Dockyard, and I was told that there were several hundred in use in London, and also at Aldershot and Portsmouth. They are distinctly an advantage. Therefore I think the straw bed might be replaced by the coir bed in Woolwich. Why should the soldier lie in a straw bed? We have long since chucked away the straw bed for sick men. Florence Nightingale says if you want to kill a man who is seriously ill put him on a straw bed, because it takes out much of the vitality from a man. The soldier's bedstead is 27 inches wide—his mattress is too narrow and his sheet is only 50 inches across—while the hospital sheet is 72 inches. We want a lighter bed with wire-woven mattress wider than the present. We want hospital pattern sheets, and blankets scoured at least once every six months; but the sheets must be washed every week.

I have put down here under the head of bedding the guard-bed. A more brutal, useless and thoroughly unfit construction does not exist in the army. It is not of the least use to train a man for war. I have been in five campaigns myself, and everyone knows that no one is asked to lie on anything like the guard-bed. There is no reason whatever why the bedstead, with a mattress of hair, should not be found in the guard-room. If you speak to the soldier he will say,

"Certainly, I would much sooner lie on the ground in the field than on the guard-bed in barracks." What is gained by this guard-bed? Remember that you do not harden your men. No officer ever yet hardened his men. Why, the officers beat the men in everything, and we go out to war off very good beds. If we want to be hardened let us all go on the guard-beds together. If you give the soldier a proper bed for a guard-bed he will do his guard better; it is not the sentry-work alone that knocks him up, it is the guard-bed; they are terrible contrivances, the remains of the bad old system. We want now to give the soldier a bedstead with a mattress of coir or hair, so that in the intervals of his sentry-go he shall get some chance of sleep.

About the question of clothing. I will not now deal with the question of tunics and those things, but as regards the question of the flannel shirt. The old army wore always a calico shirt, but General Herbert, who was Quartermaster-General 15 years ago, devised at Pimlico a grey flannel shirt which contained 47 per cent. of wool; it is not a woollen shirt altogether, but it is a great improvement upon the old one. Now we find great difficulty in getting the men to wear them, there is a laxity about it in some way; there is a want of the old parade system. I remember years ago how the soldier tucked up his sleeve and showed his clean shirt at the wrist. While you are sending men up to the hospital with bronchitis you must remember that every man whom you send up throws more work upon the men behind. If you want to know why the men get bronchitis it is because they do not wear the flannel shirt. It is of importance that he should also have some under-vest and not go out in this poor thing he is now wearing. Then he wears this shirt night and day, and it is very dirty. There must be a reinvigoration of the check of the "No. 1," or whoever it is in the artillery, or the Colour-Sergeant in the infantry, or the officer himself must do it. That is to say in this short service unstable army, in this raft that sinks in mid-ocean under our feet, there is only one stable element—not the non-commissioned officers, not the men, but the officers. So far as I can see, as the old system gives way and the new system comes on, it is more and more essential for the officer to be able to answer for everything about his men. I think that, as in the mounted corps you give every man drawers, you should give a pair of drawers to every soldier in the army; the men would be healthier and better, and there would not be so much coughs and colds. And I would myself like to give the men some suit to sleep in. I said to a man sometime ago, "What do you sleep in; do you wear a night-shirt in barracks?" "Oh, sir, they would tear it off my back in the barrack-room if I wore it." But many of those men have been accustomed to better things. You would be surprised when a man comes before you as a recruit looking grimy and dirty, and to find that, although uncared for, this man has been in his own home well-cared for. I ask him, "Did you have sheets in your mother's house." "Yes." Then I ask, "Did you have night-shirts," and they always say they had. In the army they are sleeping in their day shirts often for more than a week, and that produces the most frightfully sickening odour in the

barrack-room. On the troop-ship and in India a sleeping suit would save much trouble. The moment I go back to India I will propose that every man should get a regulation sleeping suit, I am sure it would improve the men's health, certainly it would improve their cleanliness, and it would improve the air of the barrack-room. The whole argument about dress can be summed up in this way: believe me you cannot make any man work in one dress, whether officer or man; that is to say, for example, that a man cannot go out shooting in the Highlands in a long-tailed evening coat. We want a working dress for the army; we want something for the internal barrack life of the soldier, and we want a sleeping suit for him to wear at night in the barrack-room. I notice that in Parkes' Hygiene it says that the German Army are to be entirely clothed in Jaeger suits under their clothes in war—that is to say, that they find that it pays. Of course, the existence of Germany depends upon its soldiers, and she finds that it pays. Bronchitis and pneumonia in the army running into phthisis causes a great loss of service to the army, and a soldier going on guard not properly dressed gets knocked up, and a thing that often attacks him is pleurisy. I remember I was in a very exposed station in India where pleurisy was a very common thing, and I remember a special case of this: I was going round the hospital with a General Officer, whom everybody in this room would know if I mentioned his name, and I said to him, "This is a case of pleurisy," and he said to me, "What is pleurisy?" I think it was a pity that he should have had to ask such a question. If a soldier were to leave his rifle out in the rain outside the guard-room and it were to get rusty in the lock you would punish him; but behind the rifle is a much more intricate and charming rifle, and that is the man who carries it. We would be better friends if you knew more about disease, and we would be more efficient if we knew something more about soldiering. I think it is essential that the officer who commands the soldier should know what disease is likely to attack him. I venture to say that there is not a good horse-master in this room who would not be ashamed if he did not know the various ailments that might attack his horse. When I go round the stables and see the charming care that is taken of the horses—why, they are gentlemen, they are well-groomed, well-shod, well-fed, and well-housed. But your men also have got to be looked after. When I look at the hoofs of the horses they are in beautiful condition. When I go to the hospital ward and turn down the clothes of the men's beds their nails at times frighten me, they stand out like tigers claws, they seem never to cut them. They do not know how to use those things that make for sanitation, and you have got to educate them. Uncut toe-nails and filthy feet means foot-sore feet and that means inefficiency in war.

As regards the soldier's food question the history of its evolution is extremely instructive. Up to 1854 the Government made no contracts for bread or meat; it was done in the regiments by the Commanding Officer, who was sole master. He was sole master of the clothing, and the men got so snipped that the word "off reckoning" survives; the "off reckoning" was the cuttings off the soldier's clothes. In the

same way the food also was provided by the Commanding Officer in the different regiments. It was a bad system, and the Government put an end to it in 1856. The soldier drew his pay in full, and the Commanding Officer cut his ration money out of it until the Government took over the rationing and knocked 3½d. to 4½d. off for the cost of the ration. The soldier thus gets his ¾ lb. of meat, 1 lb. of bread, and his pay besides. The regimental rationing system broke down through regimental neglect. Of late years we have heard much about the improvement of the soldier's food, but I would say that the soldier has not gained very much from the State despite all this outcry. We are pursued by two things in the army, the dripping-pan and the stock-pot, but the original ¾ lb. of meat is all we have as a basis to work upon. I would say that the question of the inspection of rations is most important. No one, I think, can see the Army Service Corps Officers without seeing the enormous deal they have gained by the instruction classes which were formerly held at Smithfield and are now going on at Edinburgh, but I think that that information should not be limited to a Corps which does not serve in India, where 70,000 English soldiers are serving under trying circumstances; you cannot conceive how bad the Indian rations are, and we all want to get a certain proportion of this instruction. There should be in every regiment a certain number of officers trained in this ration passing, and the Medical Officer should certainly get an opportunity of going through the course, because the hospital rations do not come before those highly-trained officers at all. By long service in India our eyes get trained down to the bad Indian ration, and when one comes home it is well to go up to Smithfield again to find out what the proper standard of the English ration is.

I would also like to say that the Medical Officer has continually before him the question as to his right on a Board. Owing to the quibble as to what his position is, many of them are afraid to say one word on the Boards. It is very trumpery. We send down four men to do what three might do, and the Medical Officer is afraid to say one word until he is asked. I have myself consulted officers and they have said that he should certainly have an initiative. Is he to remain silent and wait until the President of the Board asks him? I say he should be a member of the Board and point out freely and fully anything that goes wrong. Why should our little trumpery frictions affect the army. I say a curse on both your houses. While we are struggling and fighting the soldier falls to the ground, but if we are to combine we can certainly do the work better, and we cannot do the thing without hearty co-operation.

As regards the question of the soldier's ration, if you would like to compare it with the officer's ration, come with me on board an Indian troop-ship and see the two divisions of the ship—half the ship full of officers and half of men. I rise and come out of my cabin, and I have at half-past 6 o'clock a very grateful cup of coffee and bread and butter; the soldier at the same time has his coffee and bread in the fore-compartment, so far we are both equal. At half-past 8 o'clock I come downstairs and have a capital troop-ship breakfast, a very good English breakfast; the soldier has his breakfast along with my early

breakfast. At 12 o'clock he has his early dinner; I come down at 12 o'clock and have a quantity of cheese, sardines, and beer. At half-past 4 o'clock he has his afternoon tea or coffee, and I have mine in the Saloon. But there the comparison between the soldier and myself ends entirely. When I went out to India I found that the last meal given to the soldier was at a quarter-past 3 o'clock in the evening. I wrote to the officer in command of the ship pointing out the long interval that he went with no food, till half-past 6 o'clock next morning, there were swarms of undergrown boys going out, and those boys were getting no food all that time. He said he was awfully sorry, but he could make no change; he would refer the matter home. But when I came home the other day the same thing was going on. And, remember, I was going down at 6 o'clock to a remarkably fine dinner; dinner on a troop-ship is a great restorative after the fatigues of the day, but the soldier had no dinner at all, he was without it. And what would our lives be in India, or all over the world, if it was not for the messes, which have made our lives happy and pleasant? Let us remember, then, the soldier by comparison with the officer is short of one meal. On the troop-ship you can see it in a microcosm; I am getting a good dinner and he is not. And who are these men? There are swarms of young soldiers going out to fight against typhoid who want food awfully, and there are swarms of them coming home tired and worn out by the Indian climate to a warfare which is far more bitter than any Indian campaign, the warfare in East London, leaving them far more dangerous to the public. I see them here in Woolwich. The other day I saw a man who was knocked to pieces with ague. I said, "I remember your face well." "Yes, sir, I met you out in India; I am knocked to pieces by ague," and the Indian Government, which is using these men for seven years, sends them home, and they are turned adrift at home on the same pay that a man may get by serving his whole time at Woolwich. If India uses those men I say that those men on coming home should receive a surplus reserve pay for the first year to carry them over the bad year when they are recouping from the wear and tear of Indian life. This question is of great importance—India exists by those men; the private soldier made India for us and he gets nothing at all out of it. We want to make him the same as the Indian officer who comes home on furlough. Let us give him a certain special retaining fee for the first year when he comes home so that he may fight his battle, a terribly bitter battle, for work in England.

On the question of the soldier's food we are pursued by the stock-pot and the dripping-pan. Now the stock-pot is not used in the great mass of garrisons, and it is not popular; the men have an idea that the stock-pot is recruited from the bones that every class of man has nibbled at the dinner table, which is not the case, of course. The removal of the bones by unhandy men knocks the meat very much about. As a result it is not much used. So far as the Government ration and the 3½d. or 4d. stopped for groceries go, the soldier is still, to my mind, underfed. When you compare the feeding of different foreign armies—we do not want to compare ourselves very

much with foreign armies—but there is one army that I like to compare ourselves with, which is composed of men of our own race, that is the United States American Army, which is largely composed of Irishmen and Englishmen. There the ration of the soldier is a very fine one. It is put down at 1¼ lbs. of meat daily (against our 12 ounces he has got 20), and also 18 ounces of bread against our 16; he also has 1 lb. of potatoes, which our men do not get at all. We are trying to keep the soldier on a ration that he cannot do his work on. We give him his 1 lb. of bread, and his ¾ lb. of meat and stop him 3½d. or 4½d. a day for the grocery ration, but it does not keep the man going, and the way to prove it is that in those corps that are better paid, like the Army Medical Service, the Royal Engineers, and the Army Service Corps, the men lay out much on food. Do you think it goes in drink? Not at all. A man drinks because he wants food. The measure of his shortness of food is the measure of his amount of drunkenness. And I find that in those corps the men are using their extra means largely to buy extra food. I maintain that if extra food were given it would largely diminish drunkenness. In a foreign garrison that I served in the drunkenness in certain corps was terrible; there was bad food, and, as a result, much drunkenness. Feed a man well and give him change of food and he will not drink so much; it would be a thoroughly good investment to feed the soldier well. A man wants at least his 1 lb. of meat a day. I have asked dozens and dozens of soldiers if the ¾ lb. meat ration is sufficient, and I find they are all laying out extra money; those other well-paid corps are all laying out more money to keep themselves strong and fit. What for? To keep themselves strong for England's sake. Look at those young recruits who are going out to India to fight typhoid; they want to be well fed most awfully. The whole subject of the fitness of the reserve soldier for hard work on leaving the army depends on whether he had been well fed in the army. If he is poorly fed he is not fit for the terrible struggle for work in civil life. I think no work can be heavier than that of a driver of artillery, and if you want to get good work out of him you must put good food into him; in every class that is wanted. I am distinctly of opinion that he would be a soberer and a better man if he had more food. The German war ration is very striking; it is put down in Parkes' book as 26 oz. of bread, 53 oz. of potatoes, 17 oz. of meat, and he also gets a ration of beer. This great fighting machine, the German soldier, fights because into his body you put plenty of food. And in every case it is the same thing. The English navvy is thoroughly well fed, and no man works like he does. And in the same way with the soldier, every penny that we give him in the way of food will diminish his sickness and his drunkenness, and it will be a capital investment. I say the measure of his drunkenness is the measure of his want of food. And also another thing is his tobacco; the soldier is perpetually smoking. I think his drinking and smoking are his attempts to satisfy his demands for food. When I have a man brought before me suffering from drink I say to him, "How much do you lay out for extra rations?" He says, "Not much." I say, "You must eat plenty of food and take less beer." Less beer and more food is quite the true principle to go upon.

And I should like to point out how one class of men has settled the question about rations, that is the sergeant class. The soldier is paying from 3½d. to 4½d. a day for his ration, but the sergeant is paying sometimes from 6d. to 7½d. But is the sergeant a harder worked man than the private? I do not know that he is physically; but he, too, wants more food, and the measure of the sergeant's money is what the soldier wants, he wants 4d. extra given him in pay or allowances to make him a better fed man. And you see it in this way. The moment a sergeant is broken, and put back in the ranks, he is pulled down at once by the want of food.

And as regards the question of men going to the different recreation rooms (which is growing up more every day) to get some more food in the evening I would like to say that it is working up towards one thing which we have and the sergeants ought to have. What would our life be without our mess dinner? It is working up towards a good substantial evening meal for the soldier. I cannot think why the sergeants do not have an evening meal. They say it would cost too much; but it would keep them out of harm's way. When a man is eating he is in a very safe condition. The "liver" comes much more from drinking than from food. I was for several years Medical Officer of a great military school, and those years acted upon my life enormously, I shall never forget them. When I went there I found those young growing boys getting dinner, just like the soldiers, at a quarter-past 2 o'clock in the day, and they were left all the evening to their own devices—as to food supply with very bad results. I say that for a man to live on lobsters, sardines, and salmon, and that kind of indigestible food in his bedroom at night is a defective system. I say that the tea squad system was a defective system—and I know it because the cadets come before me ill, and I say that whatever I have done in my service there is nothing that I congratulate myself upon more than that I was able, by constant and reiterated reports, to get that late dinner for them; and it is a perfect success, I think, in every way. The soldier, I maintain, who is wandering round the town now looking about for amusement, and also, I think, looking perhaps for food, would be a happier and a better man if he got a good meal in the evening.

I would say a word also about the cooking. Throughout nearly the whole of the Woolwich garrison the preparation of the food of the men is still done in the barrack-room. We have reports continually of the lavatories being choked by pieces of vegetables and potato skins. And the dishes are not made in the kitchen under the surveillance and instruction of the master cook; he is devoting his whole time to watching the consumption of the coal, whereas he ought to be, and is sometimes, instructor of the cooks. The dishes are often made up by the men by roster, and there is not much real development in this most important art of cookery; and the result is that the sergeant cook, a trained specialist from Aldershot, is below watching the coal instead of watching the actual preparation of food. This is a matter that might well come before you. Then you ask, perhaps, is there room enough in the kitchen to do all this; it is very small. Well, a kitchen should be devised with a preparation-room outside of

considerable size, airy, and clean, where the dishes could be prepared. And I think also that the day is rapidly coming when you should have a dining-room for the men, and if I could devise such an arrangement in my fancy's eye I see before me in the future a receiving-room for rations, opening next into a large room for preparing the food under the eye of the master cook, then passing by a door into the cooking-room, and then passing away into the dining-room where the men would sit down and eat their meals (not as they do now in the bed-rooms), and that same dining-room if it were properly warmed and lit would keep the men together in the evening. Of course, the battery unit and the company unit are very important to preserve; and this company dining-room and battery dining-room would, I think, be a great improvement for the soldier.

As to the comfort and appearance of the barrack-rooms much still remains to be done—and while referring to this point I may quote the opinion of Lord Wolseley who allows me to publish his remarks. He says, "when I came to Ireland over three years ago, I gave orders to have not only the hospitals but all the barrack-rooms tinted a pleasant hue. I find it takes away the prison look from our barracks which I regard as most essential, and now that coloured pictures of a very interesting and pleasing nature can be obtained cheaply, there is no reason why every company should not make its barrack-rooms homely and comfortable."

"We pay our men so wretchedly that we can only hope to entice men to enlist by making them happy whilst they are with us, and the first step towards happiness is to make mens' dwellings bright and cheerful. We have done much in recent years to improve the condition of our men but, much, very much, remains to be done."

One last word, about the question of punishments. When I first entered the service soldiers were being continually being tried for habitual drunkenness. I used to keep ready in my room dozens and dozens of court martial certificates, and the regimental court martial had lost its prestige because it was doing the work that the Commanding Officer since is doing so much better. What was the result of the system? You put a man in prison, and you put his work upon his comrades. I would say to you that so far as my experience goes long terms of imprisonment have done enormous injury to the soldier. When he comes out the man has lost strength, he plays about between you and between us, he is here, he is in prison, he is in hospital. I think, myself, the fining system for drunkenness was a tremendous boon, because the man went back at once to his duty—he did not throw it upon his comrades—and to his rations; and I am sure he was a better man than he was made by long terms of imprisonment, and I hope the day will come when you can get rid of those long imprisonments out of the army.

Long terms of imprisonment in Indian military prisons, often for unimportant crimes, act with highly injurious influence on the soldier's health and his fitness for the battle of life after the soldier leaves the army. I cannot think that anything more than one year's imprisonment should be given to a soldier in an Indian military prison—for if

you do give him longer terms he becomes so enfeebled as to be liable to all tropical ailments, and eventually he is thrown on the English labour market, weak and broken down, and sinks into the useless soldier tramp whom we all know so well.

I hope the day is rapidly coming when simple expulsion from the army will in itself be a most serious punishment, just as the expulsion of a constable from the police force is a real blow to any man who undergoes it. The least rise in the soldier's pay will tend to bring about that happy consummation.

I would say, finally, that we want above all things to combine in this work. I have no power to speak in the name of the medical service; but I say emphatically that our whole desire is that every want that you have should be met. If up to the present time there have been troubles and difficulties in the initiation of a new system I would beg you to remember that our whole aim is to come back to you and to do more for you than the regimental doctor ever did, but we must remain a unified corps.

The Chairman—We shall all agree, I am sure, that we have heard a most interesting lecture which has covered so many points that I really do not know what to mention out of them. I do not know whether any officers have any questions that they would like to ask, but I am sure that Colonel Evatt will be very pleased to reply to any points that may be put to him. What he has said will lead us, I hope, to co-operate with the Medical Officers in many things—in some matters, of course, we can do nothing. We cannot give the soldier 3600 cubic feet of air, but we can bring our influence and opinion to bear upon the state of the barrack-rooms. Certainly one hears from Military Attachés and others that the barracks of the Russian and Prussian Guards are far ahead of our men's barracks.

Major F. A. Yorke—There is one point only that I would like to mention with regard to what Colonel Evatt said about a soldier's dining-room. In the Riding Establishment we have been very fortunate. It is not any credit to myself, but circumstances have so happened that I could get a dining-room where the men all sit down, with a white oil-cloth put over the barrack tables, and we were allowed to get carving knives and forks and all the little things that make a dining-room look comfortable. The consequence is that the men sit down there every day to something more like what they would have in respectable civilian life, and that has had a great effect. I notice when I go round the rooms inspecting them that there is a great absence of that nasty sort of faint smell of food that there used to be in the barrack-rooms, and the men certainly appreciate it very much. It is, I repeat again, no credit to myself, but circumstances so happened that I got a spare room given to me for the purpose.

The Chairman—It only remains for me now to thank Colonel Evatt on your behalf for his most interesting lecture.

CLIPPING BATTERY HORSES.

BY

MAJOR A. H. C. PHILLPOTTS, R.A.

Major Challenor in his article in the R.A.I. "Proceedings" for December last advances a large number of reasons why our troop horses at home should be clipped all over during the winter months.

I will not deny that there is something to be said in favour of clipping, but, on the other hand, there is much to be said against it and, in my opinion, there are great and very serious objections to the practice.

To commence with, Major Challenor cites India as an example where horses are invariably clipped all over, but a moment's consideration will remind us that the conditions obtaining in that country are vastly different to those in a temperate climate.

In many parts of India, the heat during the day, even in the "cold" weather is considerable, and the practice camps, camps of exercise, and changes of station and all hard work take place during that season when the Australian horse carries a long coat, and the removal of it is often almost a necessity.

At home, the conditions are quite different, the temperature during the winter is always such that when out of his stable the horse, except when actually being ridden or driven hard, must require the natural warmth supplied by his winter coat.

It is impossible and undesirable that horses and men should not sometimes be kept standing in the cold even after fast work and then if the horse has been deprived of his natural covering he is bound to suffer. He shivers, gets tucked up and looks generally miserable. He would eventually lose condition and probably end in contracting some catarrhal affection.

The possibility of our troops being ordered out on service or in aid of the Civil power during the winter months does not to me seem such a very remote and unlikely contingency, and even did it never arise surely we ought always to be prepared to take the field.

Then again I maintain that outpost duty, reconnaissance, and taking

up positions after a rapid advance of some miles ought to be constantly practised. How would clipped horses fare under such circumstances?

Of course most private horses required for fast work are very rightly clipped, but if required to stand about even for a few minutes a rug is at once thrown over them, if they are carriage horses or if riding horses, they are always kept moving. They are housed in warm, comfortable stables, with plenty of clothing on when their work is done.

How different from the cold, cheerless and draughty troop stables!

Artillery and Cavalry horses really work more under the conditions of wagon and dray horses, and these latter are seldom or never clipped except perhaps on the legs and under the bellies.

I would here protest most strongly against the tendency to apply the test of peace time requirements to military matters and to judge soldiering from a civilian point of view.

This no doubt is largely due to the fact that we have had no campaign in a temperate climate for 40 years. A long peace leads to the adoption of unmilitary practices which are detrimental to efficiency for war and unsuited to hard campaigning. What is admirable for the hunter is often quite unsuited to the war horse.

Just before last Christmas, as an experiment I took my battery across to North Woolwich on the Free Ferry, marched to Romford, watered and fed horses, gave the men luncheon, and marched back the same way arriving in barracks before dark. It was a cold day with very high wind, and owing to the private traffic the ferry had to make on the outward journey three trips before the battery was all across, and two when returning, there was necessarily some standing about in the cold on the banks, the crossing itself was very cold and had the horses been clipped they must have felt the cold when halted at Romford.

I quite agree with Major Challenor that a vast amount of time is often wasted in trying to dry horses with long coats that come in hot and "break out" again. If such horses be fed on straw in place of hay and water be sparingly given them until they are cool, it will be found that they sweat much less.

In any case it is useless to keep on trying to dry these horses in warm stuffy stables but instead, they should be slowly walked about for a few minutes with the saddle blankets thrown over them if necessary, and then brought in and dried as far as possible, after which they may be safely left to take care of themselves, the blankets being again put on if the weather and stables are very cold.

While on the subject of blankets, I may mention that the complicated arrangement of numnah with straps and light blanket is, I consider, a mistake and unsuited to the rough and ready work of campaigning. A good thick blanket eight feet square and weighing at least 8 lbs. would be more efficacious in preventing saddle galls and would form a serviceable protection for the horse on the picket lines.

In this matter also, appearance and peace time requirements seem to have prevailed over utility and the exigencies of war.

I cannot think that leaving horses unclipped renders them more subject to chills and chest affections, my experience is certainly the

other way. As regards conditioning horses in the winter, long slow work in marching order and plenty of oats is the way to get horses hard and fit for great exertion.

After more than twenty years experience in the mounted branches I must say that I have never seen harness or appointments damaged by the horses coats being unclipped. And as regards galls and chafes surely the tendency to these is reduced not increased by leaving the hair on, in fact with this object in view, many people do not clip hunters under the saddle.

The matter of skin diseases does not affect the question of clipping, as they are practically unknown in army horses at home.

As regards the action of the skin, by clipping horses and standing them in the cold, you must certainly check it.

If the advocates of clipping would only be honest, they would acknowledge that their real reasons for wishing for its adoption in the army, are that horses so shorn look smarter, that the harness does not get quite so dirty perhaps after a long day, and the men are saved a little time which they can then devote to polishing harness.

Personally I shall be glad to see the day when all leather work is kept soft and serviceable with soap, and the metal work is either made of galvanized iron, brass, or aluminium.

Batteries will then be able to go out four or five times a week with horsed guns for instruction and that melancholy intellect sapping institution—exercising order—will be abolished throughout the service.

MEMOIRS
HISTORICAL AND BIOGRAPHICAL.

THE BROME-WALTON FAMILY.

BY

MAJOR AND QUARTERMASTER R. H. MURDOCH, R.A.

(Assistant-Superintendent of Records).

(Continued from No. 1, Vol. XXI., p. 39.)

Chapter V.

The Seven Years War.

Per Mare, per Terram.

In the wars of the Austrian and Spanish *Successions,* France and England had crossed swords, not as principals but as auxiliaries or "cats-paws" of the continental Powers—a *rôle* beneath the dignity or genius of either of these first-class neighbouring nations: yet, the long years of European peace which followed, and the powerful stimulus imparted to commercial and international reciprocities, rapidly subdued race animosities and began to set up (among the travelled, the commercial community, and even in the army) a mutual constraint towards solidarity—engendering on our side a very considerable Gallican sentiment towards our brave and sprightly rivals, even to affectation of the language, dress, manners, and alas! the morals of the French[1]—so that, as with Ireland of to-day, only a channel tunnel was needed to draw nigh peoples estranged by separation.

In the year 1755, however—fatal to the peace of the world,—a splenetic fit of jealousy or ambition impelled the French Court to tread upon the tail of the British Lion, in America, East and West Indies, Africa, Hanover, and to threaten, also, an invasion of our own shores, with the fatuous idea of reducing Britain to play second fiddle to France in the European concert.

By the treaties of peace concluded at Breslau, 1742, and at Dresden, 1745, Maria Theresa of Austria ceded to Frederick II. of Prussia six principalities of Silesia and the county of Glatz. The loss of these fine

[1] "Modern Europe" (Russell), Vol. II., p. 436. "Gentleman's Magazine," 1751-8, "Estimate of the Manners and Principles of the Times," 1757, Vol. II. "Annual Register," 1758, p. 373 ("Remonstrance of the Mob against the Importation of French Words, &c."). Our present military French terms date from this period.

territories was too painful for her not to think of recovering them. For this purpose she concluded an alliance with Elizabeth of Russia, and personal enemy of Frederick; brought over to her cause the King of Poland, and the Elector of Saxony (Augustus III.); and attempted to form a closer union with France notwithstanding the enmity that had existed for centuries between that kingdom and her own. While Maria Theresa was occupied in these projects, the dispute arose between France and Britain, relating to the boundaries of their respective possessions in North America (Nova Scotia)—France being the aggressor—which ripened, in 1755, into open hostilities, the active operations resulting from which formed the subject of Chapter IV. of these *Memoirs*.

Hanover. In the *Seven Years War* in Europe, which broke out in 1756, Hanover was the apple of discord to embroil Great Britain in continental politics, as ally of Prussia; and the King of England threw down the glove, on 17th May, 1756, by declaring war against France—France thereon ranging on the side of Austria, Russia, Saxony, and Sweden, with an army, ultimately, of 180,000 men. The British operations by sea and land throughout this war were directed against France alone, as principals; and England subsidized 40,000 Brunswickers, Hanoverians, and Prussians—in terms of alliance with Frederick, made in January—as an army of *observation*, to be commanded by the Duke of Cumberland; while the King designed despatching also a British force.

But George II. had reckoned without the "Little England" party, then headed by William Pitt, the first, who, at this time, had not developed beyond the "Great Orator" and "Great Commoner;" and this party not only regarded Hanover as a useless appendage, but all continental connexions as inconsistent with our insular situation.[1] Not until 1758 did Pitt and the people learn, after costly experience, the lesson of the absolute waste of even the naval supremacy of Britain without alliance with some great land Power of Europe. George II. dismissed his recalcitrant minister for thwarting the contemplated British contingent; but—so great was the Pitt influence—could only send out the Duke of Cumberland alone, with the disastrous result of the capitulation of *Kloster-seven*, 1757. Hanover and Prussia were left to fate; and England sank into the most shameful panic of threatened invasion from France—to allay which the King brought over 10,000 foreign troops to strengthen our home garrisons.[2] Public spirit fled. Minorca surrendered to France; and its Governor, General Blakeney, was created a Peer. Admiral Byng failed to relieve the garrison, and was brought home to be sacrificed to the fury of the mob. Now was the hour for "the People's William;" and down went the supine provisional ministry of Newcastle and Fox.

Brought back to power, by the exigencies of the hour, the genius of Pitt was displayed in the rapidity and ease with which supplies were

[1] "Modern Europe" (Russell), Vol. II., p. 465.

[2] *Hanoverians* (head-quarters at Canterbury):—Two regiments of Guards, and ten of Foot; Artillery Train and five Companies; for all of whom 1878 tents, and ammunition, were furnished by the Board of Ordnance.—"Royal Warrant," 10th January, 1757.

voted; 20,000 men were added to the army; the Militia Bill (as we now have it) passed; the foreign troops in England sent away; France was to be conquered through America, and not one British soldier to be sent to Hanover. One significant characteristic of Pitt at this juncture was his personal selection of *professional soldiers* as general and divisional Commanders for the expedition destined against Louisbourg in the spring of 1757. On 9th April, Pitt suddenly resigned, owing to his policy of continental abstention: but a ministry without the people's idol was impossible, and on 29th June he was brought in again as coalition Premier.[1]

The army, of 31,000 at end of 1748, in England, was now increased to 80,000—exclusive of the Irish establishment,—55,000 seamen were added to the navy; and the Royal Artillery, by augmentation of four companies, formed into two battalions[2] of twelve companies each (including cadet company, 1st battalion, and the company of Sappers and Miners, which was incorporated into the 2nd battalion in 1757, after return from the unsuccessful expedition to Minorca with Byng's fleet). The spirit infused into the nation was indescribable;[3] the expectations of the people were raised to the highest pitch; full swing was to be given to the "Little England" plans of conducting a war alone against the most formidable land and sea nation of Europe; and a lesson of experience to be acquired by Britain which will be remembered to the end of time. One of Pitt's first accredited acts was to propose the surrender of Gibraltar in exchange for Minorca, so as to detach Spain from the French alliance.[4] With all his industry and dominant individuality, his powers of organisation, genius in raising "the ships, the men, and the money too," and his faculty of discerning and courage in rewarding merit, Pitt cannot be allowed to have developed into the "Great Statesman" until the true, manly instinct of the British nation—aroused, in the summer of 1758, after temporary aberration, by a sense of shame at the heroic achievements of our deserted ally, the Great Frederick, single handed against the combined armies of Europe, and by contrasting our ignominious loss of Hanover—impelled the "Great Commoner" to abandon his "Little England" convictions of the tradesman, and to organise and equip the unrivalled land fighting force for the continent which, on 1st August, 1759, by the glorious victory of *Minden* (the Waterloo of the 18th century, in its results), demoralised the French army, recovered Hanover, and secured for Europe the blessings of twenty years of peace.

Home Defence.

The volumes of Ordnance records (1756/7) teem with "Pitt" warrants, not only for home but for colonial exigencies, bearing witness to the extraordinary activity and care of this Secretary of War and Foreign Minister (at this time 48 years of age); but Pitt's first efforts in the *rôle*

[1] "Annual Register," 1757, "Naval and Military Memoirs" (Beatson), Vol. II., p. 6.

[2] "Royal Warrant," 8th March, 1757, signed W. Pitt, to Charles Duke of Marlborough, Master-General of the Ordnance.

[3] "Annual Register" and "Gentleman's Magazine," 1757.

[4] "Annals of War," 1757 (Sir E. Cust), p. 201.

of Minister of National Defence appear to have been chiefly directed towards reviving the spirit of the nation by vigorous and sensational measures for home defences:—the Hanoverians and Hessians were sent out of England; an army of 12,000 and armaments sent to Ireland; redoubts and forts built or re-armed along the coasts of England and Scotland; Milford Haven defences and harbour constructed; the Channel Islands forts repaired and re-armed; army and artillery camps formed at Hyde Park, Woolwich, Portsmouth, Byfleet (near Maidstone), Chatham Lines, Barham Downs, Dorchester, &c.; and the militia of the kingdom mobilised. At this time two twigs had been cut off from the venerable yet vigorous artillery corps—one for Ireland (Lieutenant Stratton and 24 gunners), now 3rd Field Battery R.A.[1]—as *nucleus* of the Royal Irish Artillery; and one for India (Company R.A.) as *nucleus* of the artillery of the East India Company.[2]

Byfleet Royal Camp.

But Pitt's *chef d'œuvre* was the Royal Camp at Byfleet, from July to October 1756, where the Home Defence Army lay encamped during imminence of invasion. Following the precedent set by Queen Elizabeth, the King and the Duke of Cumberland (not yet gone to Hanover) were constantly reviewing the camp, which was under command-in-chief of Charles, Duke of Marlborough (Master-General of the Ordnance), with Lieut.-Colonel Desaguliers, R.A., as A.-D.-C.—his second in command being the Right Hon. Sir John Ligonier (Lieut.-General of the Ordnance), with Captain Phillips, R.A., as A.-D.-C. Colonel Belford commanded Royal Artillery, with Forbes Macbean as Adjutant. The battalion guns were wholly composed of light 6-prs. (brass); the guns of position, of brass 24-prs. and heavy 12-prs., with 13-in. and 10-in. mortars; the field guns of light 12-prs. and heavy 6-prs. (brass); the whole were brigaded as follows:[3]—

1st Brigade—Captain Godwin, R.A., four 24-prs.; Captain Hussey, five 12-prs.; Captain Hay, five 6-prs. and 3 howitzers.

2nd Brigade—Major Cleaveland, four 24-prs.; Captain Strachey, five 12-prs.; Captain Stephens, five 6-prs. and three howitzers.

3rd Brigade—Captain *Joseph Brome*, three 24-prs.; Captain Smith, four 12-prs.; Captain-Lieutenant Yorke, five 6-prs.

4th Brigade—Captain-Lieutenant Anderson, five 12-prs.

Cavalry—Six 3-pr. Gallopers, under command of Captain-Lieutenant Drummond (why not call these "Royal Horse Artillery?")

Howitzers of 1st and 2nd Brigade under Captain Ab. Tovey and Lieutenant Chas. Torriano.

These names bring pleasant recollections to the artillery student. Here were the lion-hearted George II., Cumberland, Ligonier, and *Joseph Brome*, sole survivors of *Te Deum Dettingen* (*see* Chapter II.); Marlborough, of St. Malo celebrity, who was to lead the conjoint expedition of 1758 against the coasts of France, and, again in 1758, to land the British army in Germany; Belford, of Fontenoy and first hero of Culloden; Desaguliers, of Belle Isle, and first gunner to earn the blue ribbon of science; Godwin, of Prestonpans, Falkirk, Culloden,

[1] Lieutenant Stratton's detachment developed into a company of Royal Irish Artillery, which came back to the Royal Artillery in 1801 as No. 1 Company 7th Battalion. Lieutenant Stratton became a General Officer in the Royal Irish Artillery, and at the Act of Union came back to R.A. as Lieut.-General, Colonel-Commandant, of the 7th Battalion R.A.

[2] The Artillery of the Honourable East India Company amalgamated with the Royal Artillery by the Act of November 1859, and assumed R.A. designations on 1st May, 1862.

[3] "Cleaveland MSS.," p. 255. "History of the Royal Artillery" (Duncan), Vol. I., p. 150; original official *MSS.* (12 folios) of 1756 with *Dickson MSS.*

and of the great siege of Gibraltar; Cleaveland, first father of artillery history; David Hay, who was to win his spurs and a double brevet for knightly deeds in America; the ubiquitous John Yorke, who fought the solitary 6-pr. on the heights of Abraham; Drummond, of Minden fame, who in the French retreat acted the *rôle* followed by Sir Robert Gardiner at Waterloo; Phillips (whose Sappers and Miners, returned from Byng's fleet, were also at Byfleet), the audacious commander of artillery at Minden; Macbean, second gunner of the blue ribbon of science, and Joseph Brome's successor as Belford's regimental Adjutant; and last, not least, little Abra. Tovey, whose praises have been sounded in Chapters I. and IV.

On this occasion, Captain Joseph Brome, in command of the artillery of the 3rd Army Brigade—who had already "fought more than they all"—obtained on the spot from the King a commission for his ill-fated half-brother, *Robert* (son of Captain *Charles* Brome, by marriage with the romantic widow Walton, *vide* Chapter I.), as Lieutenant in the newly raised 37th Regiment of Foot, without passing through the grade of Ensign. Lieutenant *Robert Brome's* commission was dated 9th September, 1756 (Army List).

The expected invasion did not come off, however; and in November the Royal camp was dispersed: the Duke of Marlborough (Commander-in-Chief) proceeded with a large force to Portsmouth to form a winter army camp in the Isle of Wight; and Captain *Joseph Brome* took his brigade to Chatham Lines, during construction of Fort Pitt and of the barracks, as first artillery Commandant of the Medway Defences[1] under command-in-chief of Major-General Lord George Sackville.[2] The Channel Fleet, upon which the nation relied for her first line of defence, was engaged in ineffectual blockade of the harbours of France —for early in 1757, during a storm which dispersed the British ships, the French fleet gave the English the slip, to America; and repeated the experiment, with equal success, on return to Brest in November 1757, after having rendered abortive our designs against Louisbourg for that year.[3]

Expedition against Rochfort.

In the summer of 1757, taking advantage of the absence of the French fleet and of our neighbours being denuded of home troops to supply their army in Germany, Pitt planned a vast conjoint land and naval armament against the harbours and shipping of France; and the great preparations for this secret expedition raised the expectation of England to the highest pitch, and rivetted the eyes of Europe upon this undertaking.[4]

Its destination turned out to be against *Rochfort*, at this time one of the principal dockyards of France. The army of 10,000, under Lieut.-General Sir John Mordaunt, with a company of Royal Artillery under

[1] R.A. Muster Rolls, 1756/7. Ordnance "Orders to Paymasters," 1757.

[2] "Dictionary of National Biography," art. "Lord George Germaine."

[3] "Naval and Military Register" (Beatson), Vol. II., pp. 64–75, (1804 ed.)

[4] "Naval and Military Memoirs" (1804), Vol. II., p. 66.

Captain Thomas James, R.A.,[1] who was also to command the two bomb-ships and two tenders; also 19 ships of war, under Admirals Sir Edward Hawke (blue) and Boscawen (red). The General was put under control of a council, consisting of the two Admirals and two Generals of Divisions (Sir John, afterwards Lord Ligonier, and Major-General Conway): and without any artillery officers on the staff. The expedition sailed from the Isle of Wight on 6th September (after innumerable delays); and returned to Spithead in October without having accomplished anything beyond costing one million of money and destroying the fortress of *Aix* in the Isle of *Rhé*. For a full, true, and particular account of this expedition, and host of pamphlets to which it gave rise, *see* "The Gentleman's Magazine," 1758, pp. 4, 5, 27, 29, 32, with excellent charts on pp. 206, 588; also, the printed proceedings of General Court-Martial on Sir John Mordaunt, 1757.

A complete history of the Royal Artillery should synchronise all the army and navy expeditions against *Rochfort* and its approach batteries since that of Capt. Valentine Pyne, R.A., Master-Gunner of England, in 1627;[2] but some items may prove of artillery interest. This was the first occasion on which the Engineers obtained army rank and command apart from the Royal Artillery.[3] The courtesy of the Board of Ordnance towards Captain James, commanding R.A., is evidenced on p. 262 of the "Cleaveland MSS.," and is in marked contrast with the treatment of Lieut.-Colonel Robe on embarking for the Peninsula, 1809, in command of the artillery of Wellesley's army.[4] Captain James's "Book of Artillery," 1725 (particularised in Chapter III., foot note 5, and "Proceedings" R.A.I., Vol. XX., No. 9, p. 479), which he had with him at Culloden and at Rochfort, is now deposited with the "Dickson MSS."

As Bomb-ships drew 11 feet of water, and ships of war from 23 to 30 feet,[5] the long boat of each war-ship was, for the first time, armed with light 6-pr. (brass) at the bow by Captain James, R.A., with two boxes of ammunition (grape and round shot), worked by the Royal Artillery;[6] Captain James would have none of Abra. Tovey's *case* shot, which had not had a fair trial on its first employment with Braddock's ill-fated expedition (*see* Chapter IV.), and Captain Tovey was not employed with present expedition.

Of the two Bomb-ships—*Infernal* (commanded by Captain P. Innes, R.A., James Mackenzie, Master), and *Firedrake*—the former grounded in the Channel and was unsuccessfully attacked by French flat-bottom

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[1] Now No. 1 Company, Western Division, R.A., at Bermuda, commanded by Major A. Tracey. For armament of ye Train, *see* "Cleaveland MSS.," p. 259.

[2] "Succession List of Master-Gunners of England," *anno* 1627. "Proceedings" R.A.I., Vol. XIX., No. 6.

[3] "Cleaveland MSS.," p. 262.

[4] The first instance of "personal allowance" to officers travelling on extra regimental duty now occurred. Mrs. Pitt (not yet Countess of Chatham) summoned Captain James from Woolwich to Portsmouth, to explain the *bombs* and *grape* shot, which resulted in the following "Orders to Paymasters," 1757, "To Capt. James, R.A., as a present, for attending Mrs. Pitt, at Portsmouth, £6."

[5] "Gentleman's Magazine," 1758, pp. 4–5.

[6] Beatson, Vol. II., p. 68, "Cleaveland MSS.," p. 269.

armed boats, the latter was commanded by the plucky Captain-Lieutenant John Yorke, R.A., of the Heights of Abraham celebrity (Master, Owen Edwards);[1] and, although the Navy take credit for capture, within one hour, of the stone fort of *Aix*, which they pounded two miles off with their 18-prs., this result was undoubtedly due to the splendid shell practice of Captain Yorke's Bomb-ship, which threw some 13-in. shells at two miles range with such effect that "all of them had either fallen within the fort or in the (dry) ditch,"[2] working havoc with the garrison and the main wall. With the precedent, in 1755, of the demoralising effect of shell fire at Fort *Beau-séjour* by Captain *Charles Brome* (Chapter IV.), the speedy surrender of Fort *Aix*—notwithstanding its garrison of 600 men, and armament of 8 14-in. mortars, 16 18-prs., 14 14-prs., and 2 12-prs. (brass) "of exquisite workmanship"[3]—ceases to excite surprise.

Capture of Fort Aix.

The English Admirals were hood-winked by the French Protestant pilots, and could not get up the Channel, although the *Prudente*, a French 74 gun-ship, sailed in front of them right up to Rochfort; and the Generals were divided in the council of war—that refuge of the timid which "never fights"[4]—one insisting upon communication with the fleet as a *sine quâ non* of landing, the other (Conway) advocating a dash at Rochfort by land; while the attitude of the Admirals was highly honorable: "it is not for us, said they, to dictate to Generals the conduct of land operations, but since these cannot decide upon action we will return to England;" and to England, accordingly, the expedition returned—arriving at Spithead on 6th October.

"It is impossible to describe the murmurings and discontent that resounded through the kingdom when this mighty armament, on which the nation had formed such prodigious hopes, returned without having so much as effected a landing on the French coast."[5] Pitt threw the customary sop to Cerberus, thirsting for a victim, by resort to a general court-martial on the Commander-in-Chief of the expedition, which ultimately acquitted the General of the charge of "disobedience of orders," and the proceedings diverted the attention of the people; while the infinite resources and indomitable energy of the Premier were exerted in devising further and greater enterprises for the coming year, on the same lines of policy, to open up fresh markets for trade and to crush France in Germany by maritime expeditions against her colonies and harbours.

The Channel Islands.

The year 1758 began with still further securing the safety and efficiency of Jersey and Guernsey for defence; vast sums were expended on the fortifications, provision of ordnance, and placing the "Royal Jersey

[1] Captain Yorke must have had powerful influence: he has everywhere crossed my trail in tracking the *Bromes*; and would seem to deserve a regimental Memoir. He died as Colonel and second in command of the Portuguese Artillery.—*R.H.M.*

[2] "Naval and Military Memoirs (1804), Vol. II., p. 71. "A bomb will fly, at an elevation, two miles and three quarters," "Gentleman's Magazine" (1758), p. 5.

[3] "Beatson," Vol. II., p. 71.

[4] "Frederick the Great," by Colonel C. B. Brackenbury, R.A., p. 154.

[5] "Naval and Military Memoirs" (Beatson), Vol. II., p. 74. "Annual Register," 1758.

Field Artillery Train" on a serviceable footing. Situated between the two great naval ports of Cherbourg and Brest, and with mixed yet loyal populations, the position of these islands appeared precarious. The theory then had not become converted into the modern withering axiom, that "all defence must inevitably succumb to sustained attack;" and although these islands must ever rest with the dominant naval power, yet *coups de main* were then the order of the day. The Governor, having reported the existence of a wide-spread conspiracy to do violence to the vents of the largest and most valuable guns, demanded supplies of Nurembergian belts, while the Board of Ordnance proposed to guard the vents by additional troops. This ludicrous dispute occupied the consideration of the King and the Privy Council, on a certain 1st April, whose quaint decision is thus recorded on p. 144 of the Ordnance Royal Warrants Book, 1758–60 :—

"At the Court of St. James's, 1st day of April, 1758.

Present,

The King's Most Excellent Majesty, in Council.

. . . . . .

Whereas there was this day read at the Board a Report from the Right Honorable the Lords of the Committee of Council for the Affairs of Jersey and Guernsey, dated 30th of last month, . . . His Majesty, taking the same into consideration, is pleased, with the advice of His Privy Council, to approve of all . . . except as to the Article which proposes a Guard to be placed to secure the Vents of the Guns instead of the 53 Iron Hoops and Padlocks proposed by the said Governor; and to Order, as it is hereby Ordered, that His Grace the Duke of Marlborough, Master-General of the Ordnance, do cause the sending over the aforementioned *53 Iron Hoops and Padlocks to secure the Vents of the Guns* . . . .' (Sd.) W. Sharp."

Nothing connected with the interests of the Army was too *bagatelle* for the King and the Privy Council in past centuries. In one of the Ordnance record books, *temp.* Charles II., the King and Council had before them a petition from the Governor of Chester Castle for replacement of blankets or bedding, on which occasion (if the writer's memory serve him) it was His Majesty who directed that the petition be remanded to the Governor to ascertain how long the articles had been in use and by how many men. Imagine our Empress-Queen and Her Council being occupied in this 19th Century with such trivialities!

Foreign Expeditions, 1758.

Our canvas is too limited to depict the several operations of the Royal
East Indies. Artillery in the *East Indies*, by sea and land, and the successful stand made by Lieut.-Colonel Aldercron, R.A., to preserve the command, patronage, and promotion of the Royal Artillery from the aggressiveness of Admiral Boscawen, Naval Commander-in-Chief. The siege of
Louisbourg. Louisbourg, rendered abortive in 1757 by escape of the French fleet to Cape Breton, was to be proceeded with to the successful issue painted in Chapter IV. The hearts of Lancashire, in particular, and of the trading community in general, were to be made glad by the recovery
Africa. of our *African* possessions, Senegal and Goree, from which the French had dispossessed us in 17th century—for with these islands we captured

£200,000 in gold, immense supplies of ordnance, ammunition, and stores; the cotton industries revived, as if by magic, by the market of gum senegal (which the Dutch and French had hitherto monopolised); gold-dust, ivory, ebony, hides, ostrich feathers, amber, wax, &c., &c., flowed over in exchange for Lancashire cottons and Birmingham and Sheffield wares and trinkets; the wealth-producing slave trade came into our hands, and consequently the *West Indies* lay open to us. *West Indies.* These tidings of great joy to traders were procured by conjoint naval and land expeditions, Royal Artillery Train and Bomb-ships, in which operations, by the annals of the time but not by official despatches, a foremost position must be assigned to the disproportionate effects of shell fire from the Bombs.[1]

But all these paled before the final and colossal effort of Mr. Secretary Pitt to win success for his isolation policy by launching a crushing *coup*, by sea and land, against the coasts of France. Still refusing the requests of Frederick to send British troops to Germany, to act in concert with the army of the Allies (Hanoverians, Hessians, and Prussians), now under command of Prince Ferdinand of Brunswick (*vice* the Duke of Cumberland), the only compromise permitted by Pitt was the sending a small squadron, under Commodore Holmes, to recover *Emden*, *Emden.* capital of East Friesland, one of the safest and most commodious harbours of Germany (which 4000 French and Austrian troops had surprised and taken from the King of Prussia)—a service which was successfully carried out by the Navy,[2] and which was to prove of the utmost consequence in 1759.

The grand expedition was of a twofold character, the naval *rôle* *Expedition to St. Malo.* assigned to Admiral Anson being to blockade the French fleet in Brest, while a squadron under Commodore Howe was to convoy the army for a *coup de main* against Brittany, from which French privateers had emerged in previous year to do incalculable mischief against our merchantmen. The command-in-chief was given to Charles, Duke of Marlborough, now commanding the army camp in the Isle of Wight; the second in command being Major-General Lord George Sackville, now commanding the Medway defences. Both had sat in judgment on Sir John Mordaunt at his trial for miscarriage of the *Rochfort* expedition. The good condition of the navy and army, the aroused spirit of the nation, the popularity of the Ministry, and the discriminating care in selection of the commanders and staff, augured well for the success of this undertaking. The errors of *Rochfort* were to be avoided.[3] No council of war was to fetter the General. Two Royal Artillery officers

[1] "Annual Register," 1758. "Gentleman's Magazine," 1758, pp. 262, 286. "Naval Memoirs," 1804, Vol. II., pp. 139, 145; Vol. III., notes 124-5. The R.A. Train consisted of four 12-prs., six 6-prs, eight 5½-in. mortars, 1200 hand grenadoes, 200 round shot (fixed), 50 tin case shot, 100 shell, 20 wall pieces ("Ordnance Warrants" Book, 1758, p. 194). The *personnel* consisted of detachments of 30 non-commissioned officers and mattrosses of Captain T. Smith's Company (now No. 6 Field Battery, R.A., at Saugor, E.I.).

The Bomb-ships *Firedrake* and *Furnace* (the latter Joseph Walton's former ship, recalled from America and re-armed), with the *Cambridge* and *Holly* Tenders, commanded by Lieutenants Borthwick and Ellis Walker. The whole under R.A. command of Captain Thomas Smith, R.A. ("Muster-Rolls and Pay Lists" in R.A. Record Office).

[2] "Gentleman's Magazine," 1758, p. 198, 391.

[3] "Annual Register," 1758, p. 65.

were now to be assigned to the staff—Captain James Pattison, as A.-D.-C. to the Commander-in-Chief, and Captain *Joseph Brome* as A.-D.-C. to Lord George Sackville;[1] and the command of the artillery was given to Colonel Desaguliers, R.A. Case shot now replaced round shot for covering the debarkation.[2] As the *Rochfort* failure was mainly due to the difficulties of rapid landing of troops and artillery by long boats, flat-bottom boats were for the first time constructed and employed—after the designs of the French invasion flotilla—these could convey 63 men each, drew two feet of water, were to be rowed by 24 soldiers;[3] and, subsequently, in America and in Germany, these superseded the old pattern pontoons. The army consisted of 17 battalions, 9 regiments of horse; the R.A. of four companies of 431 men, viz.:—

Captain Joseph Brome's	2nd battalion	(broken up February 1st, 1819).
,, Abra. Tovey's	,,	(broken up December, 1758).
,, Thomas James's	,,	(broken up December, 1770).
,, Thomas Smith's	,,	(now 6th Field Battery, R.A.)

and two Bombs with two Tenders, commanded by Lieutenants Samuel Tovey, D. Price, James Garton, and Captain Gregory. The battering train consisted of 15 24-prs., 15 12-prs. (heavy), 28 mortars, 13″, 10″, and 4⅘″; the field train, of 6 12-prs. (light), 6·8″ and 6 5½″ howitzers; and 28 light 6-prs. as battalion guns were assigned to regiments.[4]

Elaborate details of the daily operations are given in the annals of 1758, and in Lord George Sackville's able account in "Hist. MSS. Commission," 9th Report (III.), 71–4; but the story may be shortly summarised. Leaving Spithead on 28th May, the transports arrived in Cancalle Bay on 5th June, and on same evening Lord Sackville and Captain Brome, R.A. effected the landing of the 1st brigade, with 10 field pieces, by means of the new pattern flat-bottom boats; next day the 2nd brigade, under Lord Ancram, likewise landed; and the 3rd brigade followed, with the mortars and heavy artillery, and encamped at Cancalle. The surprise was complete. The 1st brigade took the great road to *St. Malo*, sustaining the fire of the fort *en route* (which only knocked over a few artillery horses); and the 2nd brigade took the country road for same destination. Being provided by the artillery with carcasses and combustibles, and aided by the Bombs, the army at once set to work and set fire to upwards of 100 privateer and merchant ships, the magazines and naval stores of the port, "presenting the most grand yet dreadful scene that imagination can paint."[5] *It was magnificent, but it was not war.*

The extraordinary success of the four new Bomb-ships at the siege of St. Malo, 1693, under Admiral Benbow, had ensured the permanency of this type of artillery floating batteries,[6] and the explosion of the

[1] "Gentleman's Magazine," 1758, p. 297. *London Gazette*, 1758.

[2] *Case* shot, by the Austrians, had proved decisive in the battles of *Lobositz*, 1756, and *Prag*, 1757 (Carlyle's "Frederick the Great," Vol. 7, pp. 65, 125); but established itself with the British in the Expedition against *Cherbourg*, 1758, under General Bligh.

[3] "Gentleman's Magazine," 1758, p. 242. "Naval and Military Memoirs," Vol. II., p. 74.

[4] Ordnance *Royal Warrant* of 13th April, 1758. "Muster-Rolls," R.A., 1758.

[5] "Annual Register," 1758. "Gentleman's Magazine," 1758, p. 299.

[6] *See* Chapter IV. "Proceedings" R.A.I., Vol. XXI., No. 1, p. 31.

Infernal bomb shook the city and destroyed the fort (then called "Quince"); but Benbow's squadron had not any soldiers to spare to complete the capture and demolition. It is singular that of the two Bomb-ships employed on present occasion, one, the old *Grenado*, had shared in the 1693 expedition, while the other, the *Infernal*, was named after the exploded bomb.[1] The battering train had been got ready by Colonel Desaguliers for besieging Fort *St. Malo*; but its walls were too high for our scaling ladders to admit of assault, its massive structure and strategic situation on a peninsula would have consumed too much time to overcome, and delay would have admitted of arrival of the approaching French army from Bordeaux. The Duke of Marlborough, therefore, re-embarked his army, and returned to the Isle of Wight on 12th June, 1758.

Notwithstanding the complete success of this expedition, with insignificant loss on our side, the disappointment of the nation and the disgust of the army were intense; Lord George Sackville, with his constitutional impulsiveness, threw up his employments, vowing that he would "go buccaneering" no more;[2] no General could be found willing to assume like command, except the unfortunate General Bligh, who had never seen service, and who was brought over from Ireland to organise a fresh expedition against *Cherbourg*.[3]

Change of Policy.

Hitherto the landed gentry, of both sexes, and the upper classes had favoured active intervention in behalf of our ally, Prussia; and the English people, who had never wavered in their attachment to the "Protestant champion"—as they styled Frederick—had borne with reluctance our ignominious loss of Hanover;[4] while at the present crisis the land resounded with the news of the brilliant victories of the Great Frederick, at *Rosbach*, November 5, 1757—the last battle which Frederick was destined to fight directly with the French—and at *Leuthen*, December 5, 1757, over the Austrians, which enabled him to recover Silesia; and Pitt, whose *rôle* as War and Foreign Minister was to "do" everything, while Newcastle, as Treasurer, "gave" everything, was quick to discern the revulsion of national sentiment, and to perceive that the supreme moment had arrived for changing his policy by striking an effective blow in Western Germany with the splendidly equipped army now at his disposal, in conjunction with our 50,000 Hanoverians and Hessians—under Prince Ferdinand of Brunswick—who had, since *Kloster-seven*, been maintained out of Britain's annual subsidy of £670,000 to Frederick.[5] The city and port of *Emden* had, fortunately, been captured by the Navy in May, and huge preparations were now begun for throwing an English army into it as a *point d'appui*.

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[1] "Gentleman's Magazine," 1758, p. 253 (for 1693 expedition), p. 285 (for 1758 expedition).

[2] "Dictionary of National Biography," article Lord George *Germaine*. "Hist. MSS. Commission," 9th Report (III).

[3] "Gentleman's Magazine," 1758, p. 533.

[4] "Annual Register," 1758, p. 65. "Frederick the Great" (Longman), p. 139.

[5] "Frederick the Great" (Longman), p. 140.

While the British Army and Navy were on the eve of quitting Halifax for the siege and capture of Louisbourg; armaments and artillery embarking for our African and East India possessions; and the land army being organised for Germany, the "Great Statesman" found time to organise yet another conjoint naval and military force to prosecute his tenacious purpose of destroying French harbours by an expedition against *Cherbourg*, under General Bligh, which, from an artillery and bomb service point of view, forms an epic for regimental history; from which, however, we must tear ourselves away, as it does not bear directly or indirectly upon the history of the *Brome-Walton* family R.A.

Cherbourg and St. Cas.

GERMANY.

The British army of 10,000 thrown into *Emden* on 1st August, 1758—to co-operate with the 68,000 Hanoverians, Hessians, and Prussians, under Prince Ferdinand (cousin of George II.)—was commanded in chief by Charles, Duke of Marlborough (Master-General of the Ordnance), with Captain James Pattison as his artillery A.-D.-C.; the second in command being Major-General Lord George Sackville, with Captain *Joseph Brome* as artillery A.-D.-C.

With 10,000 troops in Ireland, 2000 in Scotland, 8000 on active service in America, 7000 under General Bligh operating against Cherbourg and French ports, 3000 in East Indian and African warfare, and 10,000 now despatched to Emden, 40,000 effective fighting men and 60,000 afloat in war-ships were, in 1758, thus being maintained out of a British population of less than 8,000,000 males; and to recruit this force a short service Act was passed, limiting service to three years, or until end of the war, with clear bounty of £3 for army and £2 for navy: while the artillery standard, which had been established in 1749, for the first time, at 5 feet 9 inches, under 25 years of age, neither Scotch nor Irish, was now reduced to 5 feet 6 inches for gunners and matrosses, age, 17 to 30,[1] British or Irish subjects.

The British forces in Emden consisted of the six famous regiments of *Infantry*, viz.:—

1.	Napier's,	or	12th Regiment,	now	The Suffolk Regiment.
2.	Kingsley's,	"	20th "	"	The Lancashire Fusiliers.
3.	Huske's,	"	Welsh Fusileers,	"	Royal Welsh Fusileers.
4.	(Earl) Home's	"	25th Regiment,	"	King's Own Scottish Borderers.
5.	Stuart's	"	37th "	"	The Hampshire Regiment.
6.	Brudenel's	"	51st "	"	King's Own Yorkshire Light Infantry.

to which were soon added "The British Grenadiers."

Cavalry, five regiments of Dragoons, viz.:—Horse Guards Blue, Bland's, Howard's, Inniskillins, Mordaunt's—to which were soon added the North British Dragoons (Scots Greys), and "The Horse Grenadiers." This was the first instance of active service of British light cavalry and of light infantry.[2]

The Royal Artillery was composed of one and a half companies, under

[1] *London Gazettes*, 1758, and No. 9920 of 1759. "Ordnance Warrant," 1749. "History of the Royal Artillery," Vol. I., p. 132, "Cleaveland MSS." 21/2/1752. An enactment in same terms had been instituted during the wars of the great Marlborough, "Military Antiquities" (Grose), Vol. I., p. 97.

[2] "Annual Register," 1759, p. 7.

Captains W. Phillips and Cleaveland, to which were added in March 1759 Captain Macbean's and detachments to complete the three companies to 400 men, in addition to six officers and 54 gunners with the infantry battalion guns, and a like number for the gallopers with the cavalry regiments; also, two officers and 20 non-commissioned officers and artificers with the pontoons.

The three companies were—

Captain Wm. Phillips', now No. 6 Company Western Div., R.A.
„ Sam. Cleaveland's, which was broken up in 1819.
„ Forbes Macbean's, now 2nd Field Battery, R.A.[1]

The *armaments* (all of bronze) consisted of—[2]

Battalion guns—12 light 6-prs., with 300 rounds per gun of fixed round shot, and 300 rounds of tin case shot with wood bottoms.[3] Six of these were lost in the campaign of 1758, and were replaced in March 1759.

		Round shot.	Fixt shot.	Tin case shot with wood bottoms.	Spare carr.
Gallopers (for cavalry)—	14 3-prs., light,	3000	—	300	4
Position brigades ...	8 heavy 12-prs.	3000	800	320	2
	8 „ 6-prs.	3000	800	480	2
	8-in. howitzers	—	—	—	–

On travelling carriages, with limbers complete.

Field brigades... ... { 10 medium 12-prs. (including the flag gun).
6 light 12-prs.
6 „ 6-prs.
6 Royal howitzers.

Tin tubes "fixt" ... { 12-prs., 2000
6-prs., 2200
3-prs., 6060
For howitzers { 700 empty shells.
30 carcasses.
700 fixt fuzes.

A device had been adopted, since the campaign of 1747, with regard to tubes, for *portable field magazines*, which in some measure anticipated the suggestive paper on this subject by Major R. Wynyard, R.A., in "Proceedings" R.A.I. for November 1893, p. 545, namely, "A Proposal for the Supply of Ammunition in the Field." The tubes were cut in exact lengths of 4 in., packed in close fitting tin cases each holding 50: these were carried in the limber boxes. For field magazines, cases were "headed up" in empty powder barrels. Each case had a leather strap. *Cleaveland MSS. 1747/8.*

Thus, excluding the "position" brigades, 54 field pieces of artillery were assigned to the British army of 10,400 men (12,000 in April 1759)—a proportion due to the preponderating influence of artillery fire at Dettingen, Fontenoy, and Culloden, which had inspired the

[1] "Proceedings" R.A.I. (Court of Enquiry), Vol. XX., p. 267.

[2] Ordnance Royal Warrants, 30th June, 1st July, 11th September, 23rd November, 1758; 27th February, 1759.

[3] The French did not employ wooden bottoms until 1772. *Letter from Sir Alex. Dickson to Lord Fitzroy Somerset, dated 11th Aug., 1820.* The "faddists" of 1803 and of 1820 got committees of field officers to consider *paper covers* as substitutes for *wood bottoms* and to avoid strappings. The scathing criticisms of Major-General Vaughan Lloyd (of Minden), 3/10/1803, and of Colonel Sir Alex. Dickson (of Waterloo), 11/8/1820, are with the *Dickson MSS.*

army with so much confidence that in 1758, in America, even infantry detachments would not move (except in one disastrous instance) without the guns; but less than four guns per 1000 were on the field at *Minden*, while the enemy had about 5 per 1000.[1]

On 3rd and 5th August, 1758, the British quitted *Emden*, and by a series of forced marches effected junction on 14th, at *Coesveldt*, with Prince Ferdinand, who reviewed them and expressed his "greatest satisfaction at their appearance."[2] Their arrival was a source of great rejoicing to the Germans; and both men and horses were objects of immense admiration: the horses were all of a superior class, those of the cavalry regiments being entirely roans, greys, bays, or blacks; and 2000 of the troops were highlanders.[3] In September the city of *Munster* was made allied head-quarters, where, unhappily, the Duke of Marlborough died of the plague, and was succeeded in chief command of the British by Lieut.-General Lord George Sackville (Lieut.-General of the Ordnance), *M.P.* for Dover, and also for Portarlington, in the English and Irish Parliaments. Sackville, at this time 42 years of age, was the spoilt child of fortune: at 24 he was given the lieut.-colonelcy of a regiment, and until 1743 had passed his time in Parliament; served in Flanders, 1744–5 (wounded at Fontenoy), and in the suppression of the Scottish rebellion; from 1751–6, a petty king in Ireland (and Grand Master of the Irish Freemasons) as Secretary for War in Ireland and first Secretary to his father, the Duke of Dorset, Lord-Lieutenant of Ireland and intimate personal friend of George II.[4] Possessed of considerable ability, and having displayed much dash and military capacity as a cavalry leader in Flanders, Scotland, and against St. Malo, Sackville was of a haughty, domineering temperament, which could not submit to control. Sent on a mission, after *Fontenoy*, by the Duke of Cumberland to Marshal Saxe, he refused to be blindfolded;[5] we have witnessed his impulsiveness after the expedition of St. Malo;[6] and he was too proud to submit to the command of the German Prince Ferdinand, with whom, from the first moment of succeeding Marlborough, he quarrelled—when, but for the gallant and good-natured Marquis of Granby (Grand Master of English Freemasons), he would have refused to show any subordination to the Prince.[7] Captain *Joseph Brome* must have had a warm time, while for one and a half years on the staff of such an imperious chief.

The historian of Royal Artillery will have to disperse the fog which envelops the operations in the campaign of 1758 by the British forces, of whom some were detached to act under the Hereditary Prince

[1] "*Guerre de Sept Ans*" (Decker), p. 261.

[2] "Campaigns of Prince Ferdinand, by a British Officer who Served Therein," p. 60. This officer, Captain William Roy, of the 51st Regiment, subscribed his name to the maps illustrative of his journal. This able work is marred by this infantry officer's indifference to *artillery* details—a defect providentially remedied by the journal of Captain Samuel Cleaveland (1st), R.A., in R.A. Institution.

[3] "Annals of War" (Sir E. Cust), 1758, p. 261.

[4] "Dictionary of National Biography" (a very valuable work), *art.* Germaine.

[5] "Proceedings" R.A.I., Vol. XX., No. 10, p. 544.

[6] *See* also "Annals of War" (Cust), 1758, p. 257.

[7] Cust (1758), p. 261.

(Ferdinand's nephew). We have sworn testimony[1] as to Captains Phillips, Macbean, and Williams having commanded 6 and 12-pr. brigades under the Hereditary Prince (*i.e.*, 1758); an incident of the overturning of some guns and ammunition wagons in the action on the *Fulde* in mid-October; the expression in Royal Warrant, 16th November, 1759 (p. 173) "Campaign in 1758 by Our Forces *in* the Allied Army;" the successful defence of *Munster*, on 26th October, against the French by a portion of the British and Hanoverians before return of Ferdinand, on 28th, who had hurried back to their relief;[2] also, among the honours bestowed, on 1st January, 1759, upon the staff for the campaign of 1758, Captain Pattison, R.A. was given a brevet, and Captain *Joseph Brome*, R.A. the *Master-Gunnership of England* (with £50 per annum for life, and official residence in St. James's Park).[3]

At end of November, owing to severity of the season, the allied army returned to winter quarters in *Munster*, while the enemy wintered in the neighbourhood of *Fulda*—each harassing the other whenever opportunity offered—and the allies received, from England and Hanover, reinforcements for the campaign of 1759, to complete the allied army to about 70,000 men, of whom 12,000 were British.[4] At this time the Royal Artillery became augmented at home by a 3rd battalion of 10 companies.

Battle of Bergen.

The year 1759 opened with the French increased to 150,000; and this overwhelming preponderance brought out all the splendid qualities of the Great Frederick's pupil and lieutenant, and of the endurance, mobility, and discipline of the allied army during the brilliant strategic manœuvres of Ferdinand—"through roads deemed inaccessible, and never before traversed by an army"—which culminated at *Minden* on 1st August.

In January the enemy had, by stratagem, seized *Frankfort-upon-the-Maine*—which secured to them the course of the Maine and Upper Rhine—and, in March, Ferdinand set out to dislodge them, if possible, leaving garrisons (of Hanoverians and Hessians) to protect Hanover and Munster; and with 30,000 (including the British) fought the battle of *Bergen*, on 13th April—the first division of the British, under Lord Sackville, being with Ferdinand; and the second, under Lord Granby, with the Hereditary Prince now rejoined. The battle began at 10 a.m. and ended at night. The French General, Duc de Broglie, kept the village of Bergen on his right, put therein eight Austrian battalions, and in the rear of it placed several French brigades on the hill. His centre and left were so secured that the Allies must necessarily attack the village before they could come at his line. Three times did the infantry attack the village in as many hours, capturing three batteries; yet in

[1] "Court-Martial" (1760) on Lord Sackville, p. 83.

[2] "Campaigns of Prince Ferdinand," pp. 66–8. The French lost 2300 in killed and wounded. *London Gazette*, No. 99,157, of 1759.

[3] *London Gazette*," 1759. "Cleaveland MSS." (unpublished portion, in R.A. Institution), item 1st January, 1759.

[4] "Campaigns," p. 73.

vain, on account of the number of batteries behind one another. Ferdinand massed his artilleries, and the remainder of the day was spent in furious cannonading on both sides, until under cover of night the Allies effected retreat, with the loss of 2000 men and five Hessian 6-prs., which had to be left through the horses having been killed. The cavalry behaved splendidly, and effectually checked the enemy in pursuit.[1]

Rothburg, Munster, and Minden, consequently, fell to the Duc de Broglie.

In evidence on the Sackville court-martial, Lord Granby stated that before the attack on *Bergen*, Prince Ferdinand sent for all the Lieut.-Generals, and in the clearest terms explained the disposition of march, with the order of battle; that this was the Prince's habit, in which he excelled.[2]

Battle of Minden.

Nothing but a decisive battle could now hinder the French from again taking possession of Hanover; and while the French Court urged Marshal Contades (Commander-in-Chief) to this extremity, this had, also, long been Ferdinand's resolution (on advice of Frederick), which *Bergen* only strengthened.[3] The measures by which Ferdinand accomplished this design through his masterly retreat upon the heights of *Minden* (like Wellington upon *Waterloo*), with a greatly inferior army and without loss, must ever cause him to be ranked amongst the greatest masters of military strategy; while perhaps there is no instance of generalship so complete and finished as his manœuvres by which he drew the enemy out of their impregnable position into the plains of *Minden*.[4]

We are not particularly concerned with the encounters, on the eventful 1st August, of the 10,000 Hessians and Hanoverians, under the Hereditary Prince, whom Ferdinand had sent towards *Lubeck*,[5] a fews days previously, to fall upon the enemy's rear (in event of victory); nor with the 20,000 allies, under General Wangenheim at Thonhausen, Kutenhausen, and Bückberg, against de Broglie, in which, until the French retreat, the allies maintained throughout the positions taken up at the beginning,[6] and right loyally and gallantly showed themselves to be as splendid troops as they afterwards proved in the Peninsula and at Waterloo: but with that of the right or first division of some 25,000 men and about 80 guns (including *Hille* camp), against Contades with some 34,000 men and 112 field pieces.[7] The greater part

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1 "Campaigns," p. 79. "Annals of War," 1759, pp. 322–3. "Modern Europe" (Russell), Vol. II., p. 495.

2 *Court-Martial*, p. 48. Roy's map of *Bergen* is the only military map of the period which shows the positions of the respective artillery batteries and brigades.

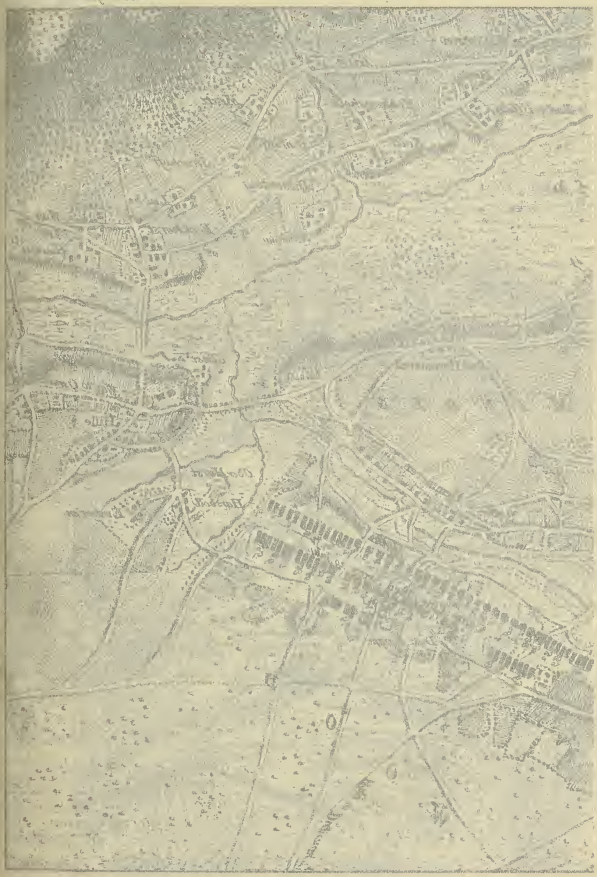
3 "Decker," p. 259 "Campaigns," p. 74.

4 "Modern Europe," Vol. II., p. 496. "Annals of War," 1759, p. 328. "Campaigns," p. 99.

5 "Campaigns," p. 95.

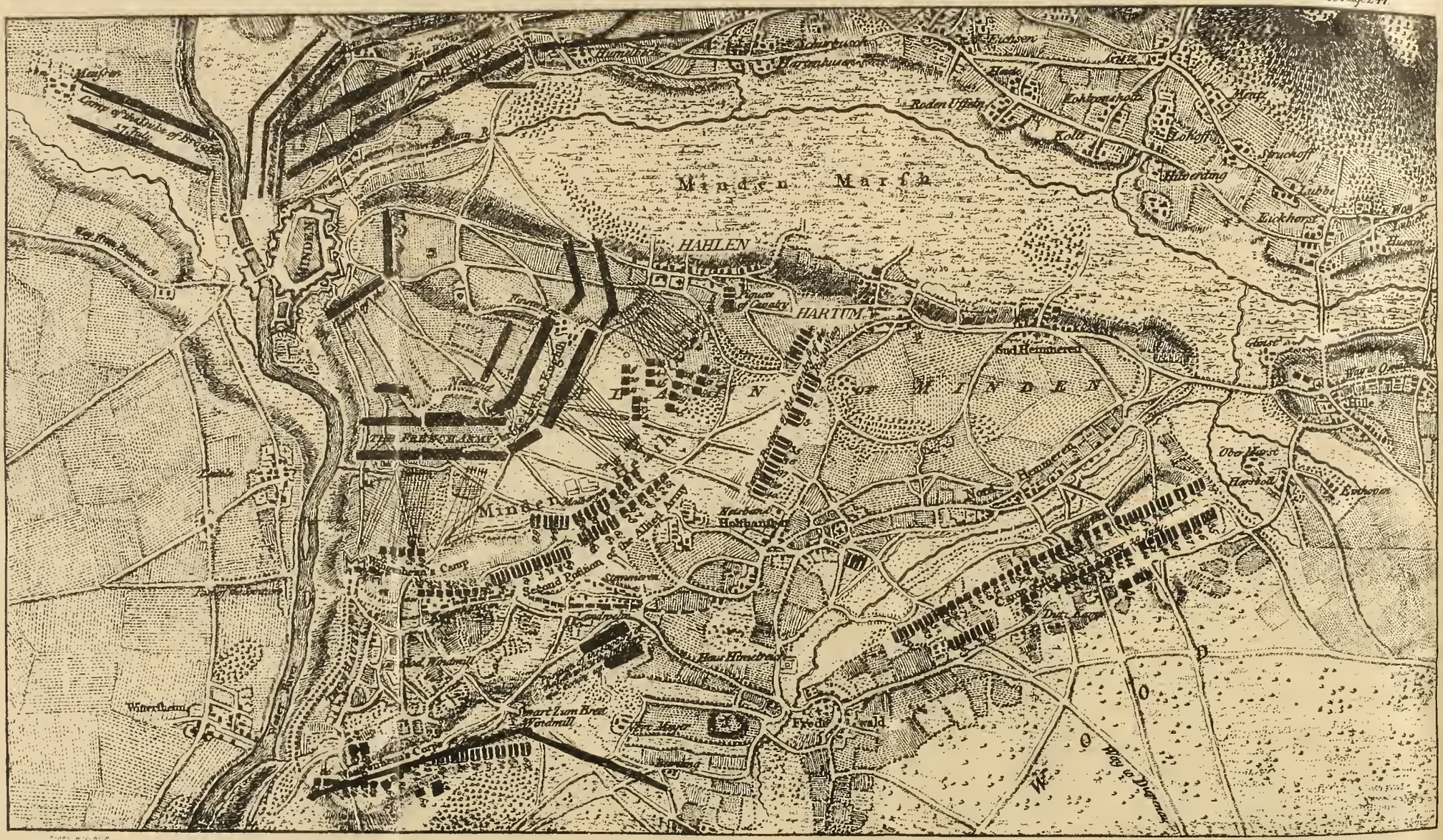
6 *Ibid*, p. 102.

7 Decker, who wrote his "*Guerre de Sept Ans*" in 1840, in giving the British only 28 guns, omits the 12 6-prs. with the six infantry battalions, the 14 3-pr. gallopers with the cavalry, and the position guns at head-quarter camp at Hille; while Roy, in his "Campaigns," gives the British 102 guns—which is incontestibly wrong—and he does not give the number of men. Lieut. Roy, 51st Regiment, was commissioned in 1756; but this youngster's volume of Minden history does him infinite credit, and makes us all the more regret that Capt. Forbes Macbean, R.A., embryo *F.R.S.*, has left us to rely alone upon Samuel Cleaveland's rough notes of artillery operations, and Cleaveland was called away from his company before Minden, to command expedition to West Indies.



THE BATTLE OF MINDEN.

to face Page 247.


Minden Marsh
HAHLEN
HARTUM
MINDEN
Minden Heath
Hemmerer
Holthausen
Fredewald
Wasserthurm
Roden Ufflen
Kolle
Hilverding
Luckhorst
Eickhorst
Ober Horst
Hartholt
Eschoven
Ghirst
Hille
Nord Hemmerer
Hausberge
Second Position
Red Windmill
Smart Ium Brist Windmill
Camp of the Allied Army
Marquis of Granby's Corps
Duke of Richmond's Corps
Duke of Wirtemberg's Corps
Prince Xaverius's Corps
Prince Frederick's Corps
Prince Ferdinand's Camp
Prince of Brunswick's Camp
Prince of Holstein's Corps
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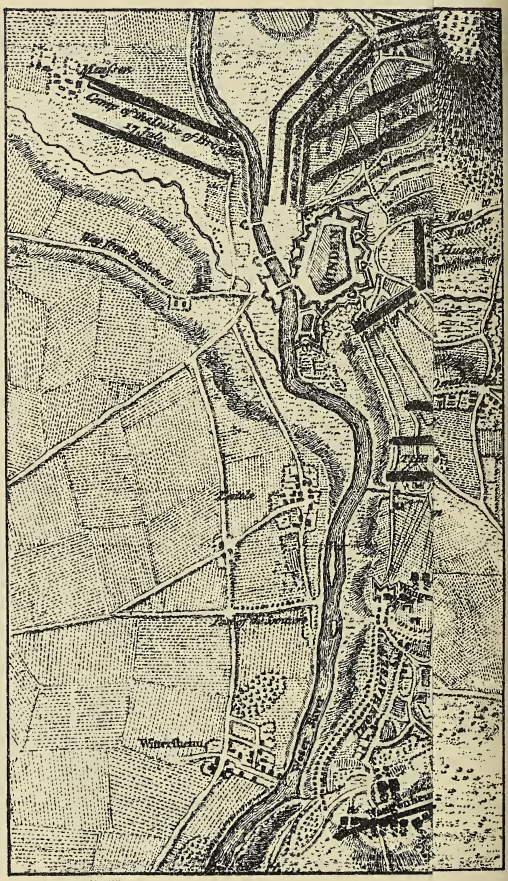
Prince of Anhalt's Corps
Prince of Holstein


Winter Quarters

of the allied infantry of the right never fired a shot before the French cavalry retreat (at 8.20 a.m.), and the glory of the day was reserved for six British infantry regiments with 12 battalion guns, two regiments of Hanoverian infantry, and three brigades of Royal Artillery, which, in the words of Lord George Sackville, "will scarcely be credited in future ages."[1]

Minden, like Inkerman, was essentially a soldier's battle—the Generals "proposed" overnight, but the soldiers "disposed" on the battle-field in the morning.

N.B.—Where the mere page is quoted, hereinafter, the reference is to the evidence of Minden commanders who were brought home in 1760 for the court-martial.

On 29th July the allied army marched from Petershagen to head-quarter camp at *Hille*, fronting Holthausen, which was fortified by Ferdinand with the "position" guns and 8-in. howitzers. On the night of the 31st, the right or first division was posted in the following order; but Ferdinand did not, and could not, on this occasion, as was his wont, explain to the General Officers his plan for attack in the morning:—

The hill of *Hartun*, on right front, was assigned to Captain Drummond's light brigade of six 6-prs. and three howitzers; and the windmill of *Halem* hill to Captain Foy's light brigade of six 6-prs. and three howitzers—each supported by the Grenadiers (35, 78, 145). On left rear of Halem was a wood, of thick tall trees, 100 yards broad and of length sufficient to screen the allied right from Minden; this wood screened Foy's brigade from the British infantry (15, 30, 79). In rear of Foy, and 200 yards behind the wood, was the head of the right wing of the British cavalry (Lord Sackville as Commander-in-Chief) with its 3-pr. gallopers; and in front of the wood were extensive corn-fields gradually sloping towards the very fine *plain of Minden*: the head of the cavalry was thus less than one mile distant from the spot where the infantry became engaged in the morning (15, 23, 35, 41, 72). In right rear of the first line, or Sackville's cavalry, were 10 medium 12-prs. (including the flag gun) under Captains Macbean and Williams,[2] constituted as an independent column, but designed to act in concert with the infantry.[3] This was called the second brigade, the cavalry being the first. In left rear of the second were the third and fourth brigades, consisting of the six British infantry regiments with 12 battalion 6-pr. guns, and the Hanoverian Guards, with Hardenberg's Saxe-Gotha regiment to aid, the former the battalion and the latter the 12-pr. brigade;[4] next came the fifth brigade, of six light 12-prs. and four heavy 6-prs. under Captain Phillips, commanding R.A., as front of the second or left wing, followed by some Hanoverian regiments of foot as

[1] "Court-Martial," pp. 175, 196.

[2] "Campaigns of Prince Ferdinand," p. 99.

[3] A *rôle* after Prince Kraft's own heart.—"Letters on Artillery," pp. 73, 77, 127. Ferdinand, however, did not regard the Infantry as the *Army*, with Artillery as *Auxiliary* only; but the two as co-ordinates.

[4] Events frustrated this aid, for Captain Macbean stated that on unlimbering he could get only 20 men from the Saxe-Gotha regiment which was too much occupied (p. 85 of "Court-Martial.")

sixth and seventh brigades. Last of all came the eighth brigade, of Lord Granby's cavalry and gallopers.[1]

The 12-prs. had seven horses per gun (87), the 6-pr. brigades five, the battalion guns two, with man harness; and the galloper guns three[2] —a revolution in carriages, limbers, and gun weights since the campaign of 1745, when the flag gun was only a 6-pr., yet required nine horses, the light 6-pr. seven horses, the gallopers four. ("Cleaveland MSS.," 14/4/1745): two heavy 12-prs. and two 8-in. howitzers of the "position" artillery were detached during the battle to assist in silencing the enemy's batteries at *Eickhorst* and *Thonhausen*.[3]

The accompanying representation of the heavy field brigade—drawn in 1786 by Colonel (afterwards Sir William) Congreve, R.A.—shows the peace establishment of six horses only.

The Battle.

At 3 a.m. the enemy began to attack *Hille*, by a battery of six pieces and by troops, as a feint; which Ferdinand disregarded, as he had amply provided for its defence. ("Campaigns," p. 100).

At 3 a.m., 1st August, Ferdinand ascertained that the enemy had begun to deploy upon the plain, with their cavalry in the centre, with their infantry split in two on right and left rear of their cavalry, and on the wings of their infantry two heavy field brigades of 10 and 30 pieces, the former, at Malbergen, crossing its fire with that of the latter.[4]

At 5 a.m. the allied right had got under arms.

At 6 a.m. Drummond's and Foy's brigades of Royal Artillery, at Hartun and Halem, opened fire upon, and ultimately succeeded in driving the enemy out of two batteries they had erected there during the night; and so accurately had the French got the ranges that they raked these two columns on the march ("Roy," 101). At same hour the six British infantry regiments and the two Hanoverians began to defile through the wood, and formed up as follows:—

6 batt. guns.	(L.) 12th Regiment.	23rd Regiment.	37th Regiment.	(R.)	6 batt. guns.
	20th ,,	25th ,,	51st ,,		
	Saxe-Gotha Regiment.		Hanoverian Guards.		

with orders to await for arrival of the 12-pr. brigade of the first line—Ferdinand apparently intending to order up this brigade so soon as the positions at *Hartun* and *Halem* had been secured.[5] But knowing, from the firing, that Drummond and Foy were engaged, and the infantry having moved off through the wood, while as yet no orders from Ferdinand had arrived for the 12-pr. artillery (78, 84), Macbean put his 12-prs. in motion at 6.30 without orders (83), on which Phillips

[1] "Campaigns," pp. 99, 100. "Court-Martial" evidences *ubi supra*

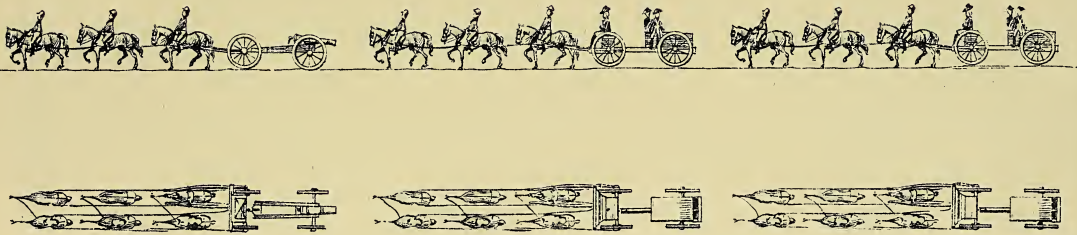
[2] *MSS.*, Order of March, in R.A. Institution.

[3] "Campaigns," p. 100. "Court-Martial," p. 27.

[4] "Campaigns," p. 101. "Cleaveland MSS.," item 1st August

[5] "*Guerre de Sept Ans*" (Decker), pp. 268, 269.

HEAVY FIELD BRIGADE, R.A.
1790.



Thurn Lith. Woolwich

rode up from the second line, and as senior took command.[1] Phillips put the brigade to the trot (reporting to Sackville and getting his lordship's approval) (175), and passing through the cavalry in front entered the wood—two of his wagons colliding in the race to be in first (113)—and immediately on emerging out of the wood he had one horse killed and one wagon hit (127, 151).

C'est dans cette circonstance qu' eût lieu un fait d'armes remarquable et caracteristique qui n'appartient encore que la battaile de Minden.[2]

A spectacle presented itself to Captain Phillips, on clearing the wood, akin to the charge of the light brigade on the plain of Balaclava. Our infantry were on the point of attacking the 63 squadrons of Contades' cavalry in face of their infantry and artillery! Alarmed at the temerity of the British, Ferdinand galloped towards the wood, sending ahead, to Sackville, Captain Wintzingerade, *A.-D.-C.*, who in French ordered Sackville "to form the cavalry into a third line to support the infantry, and to advance" (109). On the way the Prince met Phillips and returned with him into action. Phillips doubled up ten 12-prs. abreast (87), unlimbered at 900 yards (82), loaded, and within half-an-hour of passing through the cavalry had opened fire upon the enemy (80). He had only time to pour a few rounds of "shot" (? "case"—oh, gunners, where are you ?) into the enemy before the first charge of the French cavalry (80)—four of these guns being pointed by Griffiths Williams, who judged of their effect by the emptied saddles. Phillips then massed his 12-prs. upon the enemy's 30-gun battery, which he silenced in "ten minutes" (80)—although this battery had been superior to all that had been opposed to it (6-prs. of battalions, and of Drummond and Foy's light brigades)[3]—then turned upon the enemy's cavalry and infantry.[4] From the journal of this campaign and the court-martial evidences, our infantry, after forming up in the corn-fields on the Minden side of the wood, with round shot rolling among them, saw the head of the French cavalry ascending the slope from the plain, and without orders started off to attack the enemy. For 150 paces they sustained a very smart cross fire from the two batteries; but notwithstanding their losses before getting at the cavalry, the fire of musketry well kept up by the enemy's infantry, the desperate charge of 10,000 cavalry—*cette fleur de la noblesse française et l'orgueil de l'armée* (Decker)—notwithstanding their being thus exposed in front and flank, such was the unshaken firmness of those troops in the confidence infused by the arrival of our heavy artillery, that the whole body of French cavalry was broken and retired, thereby unmasking the enemy's artillery of the centre.[5] "The British troops and Hanoverian guards performed wonders. Every regiment distinguished itself. Not one platoon in the

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[1] A similar instance occurred at *St. Privat*, when the Prussian infantry and artillery rehearsed the initial parts taken by the British at *Minden*.—"Prince Kraft's Letters," p. 158.

[2] "Decker," p. 268.

[3] "Prince Ferdinand's Order and Letter." "Cleaveland MSS.," item 1st August.

[4] *See* "Prince Kraft's Letters," p. 134.

[5] "Campaigns," p. 181. "Decker," p. 268. Lord Sackville's testimony ("Court-Martial," pp. 175, 196), Court-Martial proceedings, 1760, *ubi supra*.

whole army gave way one single step during the whole action."[1]

The number of the killed and wounded will indicate the direction and impetus of the charge.[2]

(L.)	12th Regiment.	32rd Regiment.	37th Regiment.	(R.)	
	17 officers, 262 men.	9+197.	15+231.		
Killed and wounded.					Total 76+1240
	20th Regiment.	25th Regiment.	51st Regiment.		
	18+314.	7+138.	10+98.		

Lieutenant *Robert Brome,* who had received his commission at the Byfleet Royal Camp, 1756, had the colours of the 37th regiment, as junior lieutenant, and fell mortally wounded[3] by a round shot from the enemy's 30-gun battery.

We have now to turn from popular history to the evidences of the Minden commanders, in 1760, in order to ascertain the further *rôle* of the Royal Artillery in this crowning battle. Brilliant and unprecedented as was the heroism of the infantry of our right, is it not rational to maintain that but for the judgment and intrepidity of Forbes Macbean in moving the 12-pr. brigade without orders, in the nick of time, and the audacity of Phillips in command, history would have had to record the infantry attack at *Minden* as *Balaclava* charge No. 1? On receiving the order to advance, Lord Sackville put the first line of cavalry in motion, but halted at request of a Lieut.-Colonel, who had not thrown away his picket ropes, and in this fatal moment two other *aides* from the Prince arrived simultaneously with orders, contradictory in letter but not in spirit, and in the delay caused by Sackville's seeking out the Prince for direct orders, the opportunity fled for our cavalry giving the *coup de grace* to the discomfited enemy's: yet it was mainly upon this Lieut.-Colonel's evidence the unhappy Lord Sackville was convicted of "disobedience of orders."[4] At the moment of putting his cavalry in motion, Lord Sackville sent his *aides* in different directions to the front to reconnoitre: Captain *Joseph Brome* (whose evidence on the court-martial evinced the highest rectitude, discretion, and loyalty to his chief, pp. 107–8), passed through the wood, galloped under fire to the front where he found the battle raging, and the clouds of smoke from the artillery fire so dense that friends could hardly be distinguished from foes, and was back in "25 minutes" with his report to his chief.

Although the battle lasted until 10 p.m., the sequel is soon told.

At 8.20 a.m. the charge was repulsed on all sides, and the French cavalry retired, only in order to re-form; meanwhile, the second line had advanced from the wood, under Lord Granby, by direct orders of the Prince; and while Granby's cavalry shortly halted, by order of

[1] *London Gazette,* No. 9920, of 1759.

[2] "Campaign," 1759, pp. 108–9.

[3] "Campaign," 1759, p. 109.

[4] Court-Martial proceedings *in loco.* If it were possible to justify disobedience of orders, a genuine case could be presented in extenuation of the temporary "paralysis of will" of Lord Sackville, whose defence was not *skilfully* conducted; and the justificatory pamphlet of the time (copy in R.A. Institution) bears internal evidence of having been compiled by a civilian special pleader. The disposal of the Allied Army, compared with the then "Regulations for the Order of Battle," proves that Ferdinand had not anticipated the enemy so completely falling into his trap.

Sackville, the fifth brigade (light 12-prs.), and sixth and seventh (Hanoverians and Hessians) kept advancing to the front. Two large columns of Saxon infantry in the most gallant manner advanced to support the re-formed cavalry; but again the 12-prs. opened upon them, and they soon broke and disappeared (85).

Again and again the brave French cavalry formed up to charge, but never got near our devoted infantry—being repelled by the massed fire of small-arms and artillery; and each time the enemy's cavalry and infantry retreated the R.A. unlimbered and poured some rounds into them (80, 82, &c.): this continued from 10 a.m. till 4 p.m., when the enemy gave way all along the line, and made for the bridges to get back under shelter of the ramparts into Minden: meanwhile the Hereditary Prince had got round to their rear, and Drummond's and Foy's field brigades had converged upon the edge of the morass—converting *Minden* into a *Sédan*. The carnage was horrible: the enemy lost about 8000 in killed, wounded, and prisoners; 43 guns; 10 pair of colours, and 7 standards. Our loss amounted to 2800 in killed and wounded; and the Royal Artillery, 3 officers and 20 men.[1] Our heavy brigades ceased firing at sunset, by order of the Prince, under the ramparts of *Minden* (85); and at 10 p.m. Drummond's and Foy's light brigades took up the pursuit of the scattered bodies in retreat.[2] Decker was quite lost in admiration of the organisation, equipment, and achievements of our field artillery brigades on this memorable day; and Mercer tells us (in his Waterloo diary, item 1792) that in his day "*Minden* was what *Waterloo* has since become."[3]

In the Orders of the day, "His Serene Highness orders his greatest "thanks to be given to the whole army for their bravery and good be-"haviour yesterday, particularly to the British infantry, and to the two "battalions of Hanoverian Guards; the same to all the brigades of heavy "artillery. H.S.H. declares publicly that, next to God, he attributes "the glory of the day to the intrepidity and extraordinary behaviour of "these troops. Likewise to . . . . the three English captains, "Phillips, (Macbean next day, by special letter), Drummond, and Foy."[4]

The allied army encamped the same night upon the field of battle—with head-quarters at Suderhimmen—

> "Content with our hard fare, my boys,
> On the cold, wet, ground."
>
> "Why should we be melancholy, boys?
> Whose business 'tis to die."
>
> —*The Soldier's Song, at Minden.*

Next morning, at 9 o'clock, *Minden* was summoned by Prince Ferdinand, whereon the garrison surrendered, with 3000 regulars and

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[1] "Campaigns of Prince Ferdinand," pp. 103, 110. R.A. "Muster-Rolls," 1759. The No. 1 of the 12-pr. flag gun, Sergt. Wm. Robe, was the father of Wellington's commander of R.A. in the Peninsula, Col. Sir William Robe, K.C.B.; and died as Lieut. and Barrack-Master of Woolwich.

[2] Achievements of Field Artillery (May), "Proceedings" R.A.I., Vol. XIX., No. 9, p. 463.

[3] "In the north-east corner of Church Court, Chichester, next the entrance from the Cross, lived a Colonel Jones, a Hero of Minden, who was looked upon with a kind of awe."

[4] "Campaigns," 1759, pp. 111, 112.

an incredible quantity of baggage, provisions, and warlike stores.[1]

This day and the next were spent by the allies in rejoicings and rest. *The Soldier's Song,* of 1729[2]—which Handel, while President of our Royal Academy, had set to music in his own characteristic grand style, as secular companion melody to his *Te Deum,* and which was sung by our gunners at Dettingen, Fontenoy, Culloden, and Waterloo, and by Wolfe on the night before Quebec—is preserved alive, in affectionate remembrance, by the gunners of to-day with the same words, the same voice (baritone), and the same melody, General Wolfe's present *locum tenens* being the genial D.-A.-A.-G. of the Intelligence Department.[3] An account of it will be found on p. 268, Vol. I. of the interleaved edition of the two ponderous tomes of the "Life of Nelson" (by Rev. Steiner Clarke) in the Guildhall Library.[4]

A sad ending had this day, of 1st August, amidst the camp rejoicings, for poor Captain *Joseph Brome:* his chief in disfavour: his own prospects blighted: and his unfortunate brother to be sought for, ebbing out his life blood among the corn on that field of gore, whom he

> "Buried, darkly, at dead of night,
> With his martial cloak around him."

Minden, like *Waterloo,* crushed the land power of France; and, although that brave nation contested every foot of ground and maintained the struggle incessantly until the *Peace of Paris* in 1763 put an end to the *Seven Years War,* the records of the three succeeding campaigns will not supply another pitched battle.

* * * *

The task which lay before us, in introducing the hitherto unknown *Brome-Walton family, R.A.,* upon the theatres of war—that of "cutting an artillery road through the tangled jungle of impersonal history"[5]—is now accomplished; and in our next chapter we must conclude these *Memoirs* by summarising the remaining personal histories of the members of this distinguished family of gunners. The *rôle* of the Bromes was to bridge the gulf between the "Field Artillery of the Great Rebellion"[6] and the "Achievements of (modern) Field Artillery,"[7] to open the history of "Bombs" or shell fire—the sea service of which has now been bequeathed by the Royal Artillery as a splendid heritage to the Royal Navy—and to illustrate the evolution of *matériel,* and the growth of that predominance of artillery fire in deciding the fortunes of war which

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[1] "Campaigns," 1759, p. 113.

[2] With the *Brome-Walton* family papers, presented by a great-grandson of General *Joseph Brome.*

[3] This song is being re-published by Chappel & Co., of New Bond Street, who have unhappily marred one line by misprinting "d——n" for "drown."

[4] On p. 143 is an excellent portrait of Brigadier-General Köehler, R.A., Sirdar of Egypt, 1801.

[5] Chap. II., "Proceedings" R.A.I., Vol. XX., No. 8, p. 413.

[6] By Lieut.-Col. H. W. L. Hime, R.A., "Proceedings" R.A.I., Vol. VI., No. 8. *See* also Col. Hime's "Mobility of Field Artillery, Past and Present," Vol. VI., No. 12.

[7] By Major E. S. May, R.A., "Proceedings" R.A.I., Vol. XIX., No. 10. *et seq.*

must attain its climax in the next European struggle. Where we leave off at *Minden,* at 10 o'clock at night, on the ever memorable 1st August, 1759, Major May, R.A. has taken up his parable of the achievements of *modern* artillery[1] at which hour the English artillery had earned the admiration of our chivalrous opponents for its "mobility, elegance, and, above all, for the excellence of its *matériel.*"[2] "*La conduite de l'artillerie fut entièrement digne d'éloges. Cette arme parait aussi ne pas avoir manqué de chefs supérieurs dans les momens décisifs.*" (Decker, 272).

How largely the *Bromes* have bulked in these developments of the Royal Artillery, by land and sea, the readers who have so patiently followed us, hitherto, will now be in a position to determine. Quitting, therefore, the impersonal for the personal, let us close this chapter by following the further fortunes of Captain *Joseph Brome* to the conclusion of the "Seven Years War."

When Lord George Sackville, the Commander-in-Chief, obtained leave, in September, from the King to proceed to England, to vindicate his conduct before a general court-martial, Captain *Joseph Brome,* his artillery A.-D.-C., resigned staff employment, in order to continue upon active service with the allied army; and was given command of Cleaveland's brigade, which was at this time without a (first) Captain; and Brome fought this brigade, under the Marquis of Granby (now Commander-in-Chief and Lieut.-General of the Ordnance, *vice* Sackville), throughout the remainder of the arduous campaign of 1759.

Ferdinand being now joined by the Hereditary Prince, the operations of the army—until going into winter quarters (huts), in January 1760, at Osnaburg,[3] in one of the severest of German winters, and in a country devastated by the retreating enemy—consisted in forced marches, and almost daily combats, in which the cavalry more than atoned for want of action at Minden. Minden had imbued the British troops with a spirit of reckless daring; the light cavalry and infantry (a species of troops not then possessed by the French) gave the enemy no rest, day nor night; and although, from 1760 until 1763, the British were augmented by 12 additional battalions, 5 regiments of cavalry, and one-and-a-half companies (brigades) of Royal Artillery,[4] we rarely read, in the journal of the next three campaigns, an account of a fight or of a siege, without finding Brudenel's, Kingsley's, Napier's, or Stuart's regiments pre-eminent among the infantry, or the Minden gunners eclipsing their former heroism; or of some daring achievements by the dashing cavalry, without discovering that it was ever Bland's or Howard's, or other of Sackville's or Granby's *Minden troopers* who carried off the lion's share of victory.

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[1] By Major E. S. May, R.A., "Proceedings" R.A.I., Vol. XIX., No. 9, p. 463.

[2] *Ibid.*

[3] "Campaigns of Prince Ferdinand," p. 139.

[4] Capt. James Stephens's brigade (company), and a half brigade, under Capt.-Lieut. Duncan Drummond, arrived in Germany in April, 1760, and served through remaining campaigns, including sieges of Warbourg and Fritzler. The former now survives as No. 1 Mountain Battery, R.A., at Umballa, E.I., commanded by Major H. C. C. D. Simpson. The half brigade developed into an "independent company," became No. 3 company, 3rd battalion in 1825, and is now No. 5 company, Western Division, R.A., at Barrackpore, commanded by Major W. B. Hoggan, R.A.

In January 1760, we find Captain *Joseph Brome* again on the staff, as A.-D.-C. to the Marquis of Granby, the Commander-in-Chief; in February he returned to London with the Marquis and other Minden commanders and staff for the court-martial of 5th April—at which time letters from Mrs. Brome and Miss (Mary) Brome, dated from St. James's Park, to Richard Cox, Esq., the new Paymaster to the Royal Artillery (*vice* Cockburn), show that the family were occupying the official residence of the Master-Gunner of England.[1] These officers returned to Germany in April.

In April 1760, both France and England made one more strenuous effort to augment their respective armies. The story of the incessant marches and combats until December 1762, when the enemy were completely driven across the Rhine—as told by the journalist of the campaigns—is ever that of endurance, discipline, mobility, and victory, whether in the depth of winter, when soldiers died by scores, of cold; or in summer, when they dropped dead on the field, through heat. For his services in the combats of 1760–61, particularly at *Warbourg*, and the bombardment of *Fritzler*, on 13th February, 1761, Captain Brome was, at one bound, promoted from Captain to Lieut.-Colonel in the Army.[2] In all these operations, without being once mustered on the sick list, *Lieut.-Colonel Brome* was A.-D.-C. to the Marquis of Granby, who was the idol of the troops and "truly merited the appellation of father of the army, not only animating the troops on all occasions by his presence and example, but, with the greatest humanity and unbounded generosity, supplying their immediate wants with necessaries and provisions at his private expense."[3]

* * * * *

"*January 25th, 1763.*—The first part of the first division of the British troops began their march through Holland; their route was through the province of Guelderland, Nimeugen, and Breda, to Williamstadt, where the transports were ready to receive and convey them to England."[4]

* * * * *

Of the two achievements of R.A. of special interest, that of *Warbourg*, with Phillips's famous "gallop" (*Minden*, however, having been the first recorded instance) has been enlarged upon by Lieut.-Colonel Hime and Major May[5]; but the bombardment of *Fritzler*, on 13th February, 1761, holds such a happy typical mean between the siege artillery of the middle ages and of the moderns that one may be pardoned for concluding the present chapter by reference to this incident. In his caustic criticism of the artillery of the middle ages, the author

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[1] "Muster-Rolls and Pay Lists," 1760, in R.A. record office.

[2] *London Gazette*, 1761. "Cleaveland MSS.," anno. 1761.

[3] "Campaigns," p. 287. The historic picture of the Marquis, in the presence of his staff, relieving a distressed soldier and his family, is in possession of General Milman, C.B., at the Tower. Lieut.-Colonel Brome is in the group.

[4] "Journal of the Campaigns of Prince Ferdinand," p. 288.

[5] "Proceedings" R.A.I., Vol. VII., No. 7.; Vol., XIX. No. 9.

of "The Field Artillery of the Great Rebellion,"[1] attributed the impotence of the position guns (12-prs.) of that era in their prolonged attacks upon *Lathom House* and *Basing House* (castellated and fortified residences of feudal nobility), chiefly to the want of *officers* and trained *gunners*, although the *guns* were identical with modern smooth-bores; and would seem to point a moral that R.A. officers and gunners of a modern era would have made all the difference in employment of these identical guns. Let us see:—

Bombardment of Fritzler, 1761.

The "bombardment" (a misnomer with solid shot) of *Fritzler*, February 13th, 1761, was conducted by Major Forbes Macbean, formerly from what Napoleon termed *l'école de Woolwich*, and a future *F.R.S.* The Hereditary Prince had reconnoitred the fort, and communicated to Major Macbean all particulars of its internals. Macbean reconnoitred it, and made his dispositions before the Princes and Generals of the army. The whole army invested the fort, with its garrison of 1200 men; and watched with intense interest the placing of our heavy 12-prs., and the temerity of the gunners in planting the light 6-prs., within 300 yards, loaded with *grape* shot to scour the parapets. The fort was one of Vauban's pentagons, on a hill, without any ditch. One hour before daybreak the 12-prs. opened, and a furious and sustained cannonade of solid shot was hurled against the devoted garrison until sunset; yet the sacrifice was not consummated—the walls being of flints and cement. H.S.H., with princely courtesy, came, saw, and expressed "his entire satisfaction and approbation of Major Macbean's measures; yet could not conceal his impatience." At last "Major Macbean suggested" (or someone reminded him of the *Beau-Séjour* precedent) "that some *shells* be tried—which the Prince approved;" and these were "so well managed" that before 10 o'clock the garrison surrendered unconditionally.

Sequel.—"Major Macbean received the Prince's special thanks; and the town was ordered to pay him 4000 crowns in lieu of their bells."[2]

Bombardment of Beau-Séjour, 1755.

The scene changes back to our Chap. IV. in June 1755, before fort *Beau-Séjour*—a Vauban pentagon, on a hill, with garrison of 1400 men. The places of the Princes and Generals were supplied by Governor Lawrence (civilian) and a Lieut.-Colonel of infantry. The fort was invested by the Louisbourg regiment of recruits not two months raised, by some 900 British soldiers of the 47th Regiment, and by the Royal Artillery Brigade under Captain *Charles Brome*, R.A., who had been the great Borgard's pupil in 1698. Their highnesses thought this prophet would do some great thing—perhaps call fire from heaven to quench the waters of the wet ditch which surrounded the fort. For three days was this devoted fort cannonaded by heavy 12-prs. in the orthodox fashion; but on the fourth morning Borgard's pupil of a dozen sieges discarded orthodoxy, and, adopting his old master's dangerous bombs, brought up a few of his mortars and dexterously planting a few 13-in. shells into the casemates, "instantly the white flag was hoisted, the garrison surrendered, and with this chief stronghold of the enemy

[1] "Proceedings" R.A.I., Vol. VI., No. 8, p. 284.

[2] "Cleaveland MSS." 13/2/1761. "History of the R.A." (Duncan) Vol. I., pp. 215-6.

the permanent pacification of the 'Royal Province' of Nova Scotia was secured." "Captain Charles Brome has embarked for Nova Scotia"—wrote General Borgard to Governor Cornwallis, Halifax, on 12th April, 1750—"and I recommend him as *a very good officer*."[1]

Sequel.—"The General (?) was surprised—only a few bombs having been fired." "*Le Général Anglois fut surpris que n'ayant jusqu'alors tiré que quelques bombes.*" Captain Brome was not even mentioned, nor the 47th Regiment, in the despatches of the Governor, who deemed it politic to laud his local grenadiers.[2]

Moral No. 1.—'Tis better to fight under the eye of a Prince than under a Colonial Governor; and "With the word of a Prince, there is power."

„ „ 2.—Not the "officers," nor "trained gunners," only; but the "shells," *make all the difference.*

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[1] "Cleaveland MSS." item 12th April, 1750.

[2] Chapter IV., "Proceedings" R.A.I., Vol. XXI., No. 1., pp. 24 to 27.

(*To be continued.*)

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NOTES

ON

OUR MOUNTAIN ARTILLERY ESTABLISHMENTS, THEIR TRAINING AND PERSONAL EQUIPMENT.

BY

MAJOR H. C. C. D. SIMPSON, R.A.

The first point to consider is: have we a sufficient number of trained Mountain Artillerymen in our service? A study of our minor wars of the last quarter of a century, in Abyssinia, on our North American, West and South African frontiers, in our Eastern Colonies, and in the Egyptian Soudan; together with a contemplation of what may happen in the future in Armenia or Eastern Europe, should, apart from all Indian requirements convince us of the necessity of maintaining at Home, and in our Eastern Mediterranean Stations, a sufficient number of trained Mountain Artillerymen for service with a field force operating in a theatre of war where the employment of mountain guns would be, as in the past, imperative.

The value of organising in times of peace a force of Mountain Artillery for service in a country where pack transport is, if not altogether compulsory, a necessary adjunct to any force, has been fully recognised by most of the Continental powers, and the advance made by France and Russia in the past few years in this respect, is very striking.

Up to very recently, Russia as an example, although possessing a large number of Mountain Batteries for service in Asia, had practically, no permanently organised batteries in Europe. Now she has a fine regiment with its head-quarters at Kieff.

Austria, Italy, the Balkan powers, Switzerland, and Spain, have all increased their Mountain Artillery force of late years, and the latter power has made full use of their services in its engagements lately with the Riff Kabyles.

Now, our Indian and Colonial frontiers are of equal, if not greater, importance to us, as their European frontiers or Colonies are to other European states. It is not at all clear, moreover, bearing in mind the close nature of the country of England which prevents Field Artillery, except in rare instances from operating off the roads, that a *rôle* could not be found with advantage, for guns capable of moncœuvring over any ground (that an infantry soldier can work with his rifle), in the scheme of home defence.

The definition of Mountain Artillery has to embrace a more comprehensive meaning with us, than Mule Batteries operating in the mountains.

All guns in mule, or camel, pack transport for service in any country, where wheeled artillery is from the nature of the soil, or conformation of the ground, impracticable, or which can only supplement guns in pack transport in valleys, &c., must be included under the general signification of Mountain Artillery.

Elephants were finally discarded for the carriage of mobile mountain guns in pack transport, after the last Burmah campaign as unsuitable, and it has been recently laid down, that when human transport can alone be employed for the carriage of guns, machine guns, and not artillery, should accompany the force. Thus, either mule or camel, or a combination of both, are the only forms of pack transport suitable for mountain guns. The transport of our permanent batteries is mules.

It has been suggested that two or three Field Batteries on the home establishment should be converted into units equipped with Mountain guns in Cob draught for Colonial Service. Pony Field Batteries existed in the Native Artillery of our Punjab Frontier Force, and in the British Artillery in Burmah. They were found in each case to be a failure, neither fulfilling the conditions of Field nor Mountain Artillery, and were finally converted into batteries of the latter branch. It is well-known what a failure the Austrian narrow track Field Batteries were in the Bosnia-Herzegovinian War. In any case, the conversion of even only two Field Batteries would seem to still further dangerously lower the already small proportion of field guns per Army Corps on our home establishment, without any apparent equivalent advantage. What is wanted are more Mountain Batteries.

Our present permanent establishment of Mountain Artillery is 10 service batteries. Eight of these batteries are localised for service in India, and with the eight native batteries, constitute the force of Mountain Artillery from which the necessary number of batteries required for a European war on our North West Frontier would be drawn. It is, however, estimated that a reinforcement from home, of one Mountain Battery at least, would be required on the commencement of hostilities, for the Kandahar "Division of all Arms." In Natal, we have one battery for service in Zululand and our South African Frontier generally.

On our home establishment, we have one service battery maintained on an increased establishment as regards men for depôt purposes, but on a totally inadequate scale as regards mules, even for instructional purposes, for six guns. In our Mediterranean garrisons, we have some mountain equipment stored at Malta, and at Cairo; and at the latter station only, the garrison company receives some slight training with mountain guns, with 20 regimental transport mules.

The duties of the battery at home would appear to be:—

1. To perform with practically a battery staff, the duties of a sub-depôt, in training and despatching under orders from the O.C. Western Division, recruits to the nine batteries abroad.
2. To form a Mountain Artillery practice camp at Hay in the summer, for the purpose of conducting its practice as a service battery, and experimenting with new mountain equipment.

3. To be sufficiently self-contained to despatch when required, one or two sections with any small expeditionary force on active service.
4. To relieve periodically the battery in Natal. This can only be carried out at a certain time of the year, as when this battery is abroad, there is naturally no means of carrying on efficiently the depôt duties.

It will be seen, therefore, that at home we practically have no means of reinforcing our Indian Establishments, nor a single battery available for service in Asia Minor, Eastern Europe or the Colonies, but merely an overworked depôt battery at Newport. Notwithstanding the fact that there are suitable sites for quartering and training Mountain Batteries in the lake district of Cumberland, the Western Highlands, and North Wales, no expense is likely to be sanctioned for such an increase at present. Some other measures must, therefore, be suggested as a compromise, to strengthen our present position in this respect.

Under the present system of organisation, our Mountain Artillery has been formed from the Garrison Artillery units, and the branch affiliated to one of its divisions—the Western—the home Mountain Battery being, in many respects, but the sub-depôt of the head-quarter depôt at Plymouth. Thus all invalids and time-expired men, &c., returning from the batteries abroad, join the depôt at Plymouth and are disposed of by the Officer Commanding the Western Division, the former being sent to the Mountain Battery at Newport, or to service companies of the Western Division, if found fit for further service.

The majority of officers, and all the men, are selected for the Mountain from the Garrison branch, and are thus afforded a pleasant variety of duties and greater chances of active service whilst in that branch. We are rather too prone to look upon our Foot, or Garrison Artillery, as solely maintained for fortress warfare; but in the British service our requirements are so numerous and varied in different parts of the world that, in the event of war, it must be called upon to supplement our small force of Field Artillery, by carrying out the duties in the field in connection with Position or High-Angle Firing Batteries, with Ammunition Columns, or in the formation of Mountain Batteries, as required. Of course, it may be urged that although the chances of our ever requiring to put a large siege train in the field, in Europe, are excessively remote, still, if any invasion were ever contemplated, the time selected would be when a large portion of our field army was engaged abroad, and that our Garrison Artillery would then be required to man our forts. But our latest organisation of the Garrison Artillery provides for the maintenance of a large force of specialists, and as the training of our Militia and Volunteer Artillery becomes more perfected, we should, with the aid of a small force of Garrison Regular Artillery as a stiffening, be surely enabled to release a small portion of the latter for more active operations in the field. As regards a sufficiency of men for manning the guns, we are told at p. 514 of "The Army Book for the British Empire," that our Volunteer Artillery is in excess of our first requirements for coast defence.

The following measures are, therefore, suggested for improving our

position as regards Mountain Artillery establishments at home and in the colonies, where they are so absolutely weak :—

(*a*.) The present home and colonial establishment of two batteries, to be increased by one battery, by the conversion of the Garrison Company at present in Egypt into a Mountain Battery, and the whole of these three batteries to be organised in such a manner as to permit of their proceeding on active service at the shortest possible notice.

(*b*.) A proportion of men from the Garrison Companies at home to be annually put through a course of Mountain Artillery duties, and so constitute a reserve of Mountain Artillerymen, in addition to the ordinary Army Reserve men of the branch.

(*c*.) The formation of a small training school at Newport to enable the provisions of (*a*) and (*b*) being carried out, and to constitute the nucleus of a depôt.

As regards (*a*). The conversion of the Garrison Company in Egypt into a Mountain Battery need not prevent the necessary Garrison Artillery duties at Alexandria and Cairo being carried out by the battery as at present, and its establishment regulated accordingly. In the event of the withdrawal of the British troops at any time from Egypt, this battery should be transferred to Malta or Cyprus, but still to be available for any Garrison Artillery district duties that might be required of it at its station. In Egypt the ordnance transport would be possibly mules, or a combination (as in the Egyptian Batteries) of mules and camels. Whilst in Egypt the drivers would be Egyptians, but in the event of transfer to either Malta or Cyprus the drivers would be natives of those islands.

Four guns of this battery, and the whole battery in Natal, should be kept up to a war establishment of transport. The battery at home should have sufficient mule transports for the carriage of its "fighting line." This is now laid down in the new Mountain Artillery Drill-Book, 1894 (in the Press in India), to comprise the "gun line" with an additional ammunition mule per sub-division, that is 45 mules, a sub-division of "relief line," *i.e.*, six mules, and for one pair of spare wheels and elevating gear one mule, or a total of 52 mules : if only a 4-gun establishment is to be "muled," then 38 suffices. (The spare gun-carriage for a battery has long been replaced in India by a pair of spare wheels per section, as the former was found unnecessary). On service the additional transport and native drivers would be obtained either locally, or specially, elsewhere. The battery in Natal should have available for its transport in war, but not necessarily on battery charge in time of peace, a service of wagons capable of conveying its *personnel* and *matériel* rapidly to the base of operations, the nature of the country in Natal making it quite possible to employ wheeled traffic during the greater part of the year. The present depôt responsibilities of the battery at home being lightened, as explained further on, would permit of its immediate despatch on active service.

As regards (*b*). On the completion of the training and despatch of the

Mountain Artillery recruits of the year, to their batteries abroad, arrangements to be made for a detachment of men suitable for Mountain Artillery duties to be despatched annually to Newport from the home service companies of the Garrison Artillery Divisions—each triennially in turn—for instruction. The number of N.-C.O.'s and men for the course would depend on the number possible to be accommodated at Newport and to be trained at one time with a necessarily limited staff; possibly sufficient to man a half battery. Two officers, either candidates for appointment to Mountain Artillery or of previous service in the branch if possible, should be selected to accompany the men. The course should last six weeks, commencing with a month's drill at Newport, and concluding with a fortnight's practice at the Mountain Artillery camp at Hay. We should thus, in time, have a sufficient number of N.-C.O.'s and men available for reinforcing Mountain Batteries on active service, or as a nucleus, from which to form the *personnel* of any additional batteries it might be necessary to form for active service at any time.

With reference to (*c*), the formation of a training school for Mountain Artillery at the head-quarters of the Mountain Artillery at Newport, is necessary. First, in order that a uniform and continuous system of training may be carried on uninterruptedly on the despatch of the service battery abroad, as the school itself would constitute the nucleus of a depôt; secondly, to ease the very heavy depôt duties attaching to the service battery there, and so to permit of its efficient training as a service unit; thirdly, to experiment with all mountain equipment, and to fill generally for the Mountain branch the same *rôle* as do the artillery schools of Lydd, Golden Hill, &c., for the other branches of the Regiment.

The progress made in our Mountain Artillery development is at present painfully slow compared with that in the other branches, notably in equipment. For example:—It is surely time we had a better shrapnel for our screw gun than the present pattern, a lighter system of pack-saddlery, and a 12-pr. gun to take the place of our feeble 7-pr. guns of 200 lbs. and 150 lbs.

The strength of the staff would be that allowed for every other sub-depôt, viz.: a Lieut.-Colonel and Adjutant, and the usual office staff, &c., with the excess establishment allowed to the service battery for depôt purposes.

At present there is no Lieut.-Colonel on the Mountain Artillery establishment out of India, and the Mountain Artillery is the only depôt or sub-depôt not commanded by a Lieut.-Colonel. If it is not deemed advisable to increase the establishment of officers of the Regiment, it might surely be possible to place the Garrison Sub-Depôt at Woolwich under either the Lieut.-Colonel of the District Staff, or the Lieut.-Colonel commanding Militia and Volunteer Artillery of the neighbourhood. The Lieut.-Colonel at Newport should be looked upon as commanding the Mountain Artillery at home, and in addition to his usual depôt duties would deal with all questions concerning the organisation, drill, and equipment of the batteries on the home and colonial establishment. He would be the associate member of the Ordnance

Committee for mountain equipment, and should, *ex officio*, witness all experiments with the same at Shoeburyness. The instructional school would be, of course, a branch of the School of Gunnery, and he would conduct the Mountain Artillery practice camp at Hay.

At this practice camp not only shooting, but all field duties incidental to the training of Mountain Artillery, should be carried out; and officers of the branch on leave from abroad, and candidates for appointment to Mountain Artillery, should be permitted to attend the camp.

The service battery would carry out its duties as at present in connection with the training of the recruits, but a roll should be kept of all the N.-C.O.'s and men who would proceed with it for service abroad, active or otherwise. The remainder, although of course attached to the battery in peace, would constitute part of the school, and form the depôt nucleus on the despatch of the battery abroad, a proportion of the previously trained officers and men of the Garrison Companies expanding it to the necessary strength. These latter would not be necessary were the Army Reserve men of the branch called out.

The great advantage to Mountain Batteries of service in India cannot be over-rated, and it would be of great advantage to the batteries on the home and colonial establishment, were the present system of localising the Mountain Batteries in India to be discontinued, and a relief from India be carried out every six years in this manner. The battery first on the roster for relief from India, to proceed for six years service at each station, first to Natal, then to the Eastern Mediterranean, and thence home, returning to India again on completion of its home tour of six years. Thus, a battery would be moved from India every six years, and all the batteries would derive in turn the advantages of Mountain Artillery service in India, and there would ensue also greater uniformity in the batteries.

There is another point, before quitting the question of establishments, which should not be overlooked. At present there is no doubt that, in India especially, the Mountain Artillery is not a popular branch amongst N.-C.O.'s and men. The following are assigned amongst the reasons :—

(i.) Men are selected for their special physique and good character from the Garrison Artillery, but lose all the pecuniary advantages of that service on their joining the Mountain branch. (ii.) The exceptionally rough work and continuous marching, and life in small tents throughout the greater part of the cold weather, and the heavy transport expenses on the battery institutions incidental to the same. (iii.) The distaste for stable duties, to which they have not been accustomed prior to enlistment. No credit, moreover, attaches to them for the "turn out" of a mule, for which the native driver is responsible. (iv.) The extreme unpopularity of the system of localising the batteries in India, which checks re-engagement and extension of service, and causes continual scheming on the part of some of the best N.-C.O.'s and men of a battery to try and obtain transfer to Garrison Companies high up on the roster for home service.

The opinion of a large number of Commanding Officers is, that a

small addition of pay would be well expended in securing a contented body of men; and with so small a branch of the service the expense to the country would be but slight. It should be borne in mind also that, whereas the officer volunteers for the branch, the man is pressed into it from a better paid branch.

Although I do not consider they go nearly far enough, I think it right to state here that two still smaller schemes have been suggested. The first is with the view of ensuring the following :—

1. The interests and progress of the Mountain Artillery branch to be specially watched over and advanced, through the medium of some Senior Officer of the Regiment. This officer to be the Colonel-on-the-Staff, Commanding R.A. Western Division and District.
2. The battery in Natal to be relieved periodically by a battery from India, and not from home.
3. Easing the depôt duties of the service battery at Newport, by constituting a small Mountain Depôt nucleus as part of the head-quarter depôt at Plymouth, capable of expansion with the aid of Army Reserve men Mountain Artillery, in time of war to a Depôt Mountain unit, and thus permitting the service battery to be available for despatch on active service. The details of this nucleus to consist in peace of a section of screw guns with dummy mules, and a certain proportion of the invalid N.-C.O.'s and men from the batteries abroad and found fit for further service, who join the Depôt Western, and would conduct the instruction of recruits of the Western Division about to be transferred to Mountain Artillery. One officer of the Depôt Battery Western R.A. to have had previous experience of Mountain Artillery and to supervise the instruction. On the despatch on active service abroad of the service battery at home this nucleus to proceed to Newport, and on expansion to act as a depôt for the batteries abroad.
4. The term of service of an officer with the battery at Newport to be the usual two years' depôt service in peace time. This would enable Officers of the batteries in India to get occasionally a short time of home service without resigning their branch.

The other scheme is as under :—

For Colonial employment, &c., each Garrison Artillery Division to have one Company abroad trained to work mountain guns in pack transport. The battery in Natal to be transferred to the Western Division for this purpose; the Company in Egypt would be the Mountain unit of the Eastern Division; and a Company at Malta be selected for this purpose on the strength of the Southern Division.

These Companies to be relieved and revert to Garrison Artillery every seven or eight years. At Malta and Egypt they would be available for Garrison Artillery duties. All drivers to be natives of the country in which Companies are serving, the place of the European

drivers in Natal being taken by the Cape drivers at present on the Battery establishment there. Batteries to equip four mountain guns. The Companies to be designated by the letter "M" against their number in the Regimental List. The Battery at home only to train men for the Batteries on the permanent establishment in India, and to be available for active service there, or in connection with any European war or home defence.

Training.

The drills of a Mountain Artilleryman may be dealt with under two headings: Artillery and Subsidiary.

Artillery Drills.—"Field Artillery Drill, 1893," for principles, and "Mountain Artillery Drill, 1894" (in the Press in India), for details, should constitute the text-book for artillery drills for all batteries of the branch. At present a young soldier on joining his battery in India has to commence his artillery drills by unlearning what he has been taught at the depôt, owing to there being a distinct drill-book for batteries home and colonial from that for those on the Indian establishment. Any little differences in drill and equipment due to locality need only be small, and could be noted in the text of the book being published in India. Indeed, the difference in organisation and equipment, &c., between the batteries on our two establishments need be much smaller, than that which exists between the "Mountain Batteries of the Alps" and the "Mountain Batteries of Algeria." Yet there is only one drill-book published for these two establishments, in which distinctions are noted in the text-book for Mountain Artillery in France.

Subsidiary Drills.—Like all other artillerymen, the Mountain gunner has to learn a certain fixed number of drills as a soldier, prior to, or concurrent with, those of a gunner, viz.:—Recruits, marching, carbine, and sword drills, &c. These as a Garrison gunner he has been taught in accordance with the "Infantry Drill Book." On joining the Mountain Artillery—also a dismounted branch—officers and men are supposed to study the "Cavalry Drill Book," for instruction in military equitation, instruction on foot, movement by fours, cavalry sword and Martini-Metford carbine exercises.

Now the six or seven so-called mounted men, with the two senior sergeants (who may on occasions have to act as staff sergeants on parade) should of course, have some knowledge of riding their cobs. But the nature of their duties, their training and physique, scarcely necessitates their instruction being conducted on so elaborate a scale as that laid down for the mounted branches of the regiment. They are only mounted for purposes of supervision, and to enable them to perform their duties after a march with greater energy, and not for purposes of manœuvre. Like the detachments, their physical efficiency is tested by their walking rather than by their riding powers. Some slight instruction on the parade ground, and the formation of riding parties along the roads under the senior subaltern is generally found a sufficient means of instruction, supplemented as it often is by "riding school" in the "*manege*" of a battery of the mounted branches under the Riding-Master's supervision. The cavalry sword exercise is in India never

practised by officers of Mountain Artillery nor the mounted men, as over rough country being generally on foot, it is of no more use to them than to Mounted Infantry; and the mounted men are consequently not armed with the cavalry sword, but are taught to rely on their revolvers if attacked when mounted—of rare occurrence.

The "review" infantry sword exercise has been abolished in India for all branches, the "attack and defence" exercise constituting the test of a man's efficiency with his weapon to a much higher degree.

Sections 1, 2, and 5, "Infantry Sword Exercise" are alone taught. It seems unnecessary to take up so much valuable time in teaching a Mountain gunner the "instructions on foot" and "movements by fours," as laid down for the cavalry. He can carry out a foot parade inspection and march equally well with the infantry methods, in which he has already been instructed as a Garrison Artilleryman, and which he will again have to practise on returning to that branch. Finally, the carbine exercise is contained in the little hand-book for the Martini-Metford carbine, in the possession of every officer and sergeant.

A consideration of the foregoing will, therefore, I think, show that the "Cavalry Drill Book" is not a necessary text-book for the Mountain gunner.

To develop his lifting powers, all trained Mountain Artillerymen should annually, in the non-drill season, go through a course of gymnastics and single-stick drill, and each Lieut.-Colonel's command, or isolated battery, should have a trained assistant-instructor for the purpose. To look on at a sergeant who, through no fault of his own, knows nothing of how a man should really use his sword as a weapon of offence and defence, mechanically droning out the detail of the infantry sword exercise to a squad is not an edifying sight, and no one feels it more than the non-commissioned officer himself.

The theory and practice of Mountain Artillery tactics in the attack and defence of mountain heights and passes and in irregular warfare generally, should be thoroughly taught. An excellent pamphlet dealing with the combined employment of Mountain and Field Artillery in mountain districts has recently been published by *Baudoin et Cie.*, of Paris, entitled "*Marches et Avant Postes, dans la Guerre des Montagnes.*" We have no text-book in our language on mountain or irregular warfare, except the obsolete work of Shadwell.

Personal Equipments, &c.

The serge uniform and personal equipment of the N.-C.O.'s and men of the Mountain Artillery in India would be hard to improve on as regards serviceability, and is so far superior to that of any other branch of the service, that I think it is to be regretted that the Mountain Batteries out of India are not similarly clothed and equipped in every respect; any details of equipment not obtainable at home being procured from India. I refer particularly to the Indian pattern Mountain Battery sword (looked upon as the most effective cutting weapon in the service), the gaiters and shoulder-belt, and the Mountain Battery saddlery and appointments of the mounted men.

There appear to be certain conventionalities in dress at home which

are respected only on traditional grounds apparently. They are :—

1. The serge coat of a gunner must have a red collar.
2. Belts must be of buff leather.
3. Boots, and sword-bayonet scabbards must be of black leather, though a mountain gunner's gaiters and gun store pockets worn on the person may be of brown leather.

The Indian authorities insist on all the equipments of a mountain gunner (that is his boots, belts, gaiters, sword-scabbard and store pockets) being of one uniform brown leather.

Not forgetting the conventionalities referred to, we could surely assimilate the dress of our Mountain Batteries at home and the colonies to that of India more than we do, and secure some uniformity in those respects in this manner, viz. :—

The serge coat to be of exactly the same pattern as the Indian, but with red collar, to be changed under battery arrangements to blue, when the recruit joins his battery in India.

A buff leather shoulder-belt to be made of same pattern as the Indian pattern shoulder-belts with frog, enabling weight of sword to be borne by the shoulder instead of by the waist.

The present Martini-Henry sword-bayonet, utterly useless (to a Mountain Artilleryman), to be replaced by the Indian Mountain Battery sword, equally useful as an entrenching tool (in clearing away the brushwood, &c., that so frequently obscures the front of guns with a low command), as for personal defence. The gaiters to be of similar pattern to the Indian pattern.

The mounted men to be dressed and equipped similarly to those of the batteries in India. This is the same as the dismounted men, with these exceptions :—

The knickerbockers are, under battery arrangements, made up similarly to the officers' breeches. Short sword slings are worn instead of a frog for the sword, and when mounted only, special pattern spurs, with short neck, instep straps, and foot chains are worn.

This would imply the abolition in the batteries out of India of cavalry swords, jack boots, and tight pantaloons, in which it is utterly impossible to walk with any comfort over the most ordinary hilly or rough ground.

Cobs equipped with Mountain Battery pattern saddlery should be substituted for horses and cavalry saddlery, as more suited to the nature of the service and the appearance of the men who have not, when young recruits been taught to ride, and whose physique is not usually that which we associate with a cavalry soldier.

I now come to the dress of the officers.

At present the officers of the home and colonial establishments have many distinctions in dress from those of the officers of Indian establishments, which thereby causes a lack of uniformity, and an expense to an officer changing from one establishment to the other. The differences consist in the pattern of the following :—Norfolk jacket, gaiters, boots, gloves, sword-knot, spurs, mode of carrying binoculars, and saddlery.

The fact of the home "Dress Regulations" making no mention of the dress of officers of Mountain Artillery is a source of much inconvenience to officers first appointed to Mountain Batteries in India, who experience great difficulty in providing themselves with correct equipment. It is proposed to give here the detail of the same as worn in India. It is that which I would suggest also for universal adoption by officers of the branch.

Horse Appointments.—Staff pattern saddle, with shoe cases carried on D's of saddle in rear of flaps; Field Artillery wallets and appointments, but the wither straps of breastplate of hunting pattern.

Field Artillery bridle, small size. Head rope and buckling piece as for Field Artillery in India. Two straps on cantle, to carry cloak rolled 24 inches long, in marching order.

Norfolk Jacket.—Present pattern is to be shortly discontinued, and the same pattern serge coat, as worn by other branches of the Regiment, is to be adopted. The waist-belt of the coat to be detachable, to permit of Sam-Brown belt being worn. This will save the expense of a new jacket and increase of kit to an officer joining the Mountain branch.

Collar.—White, stand-up, to show $\frac{1}{8}$-in. above jacket collar, all round.

Pantaloons.—Regimental pattern, but cut extra loose in the seat and above the knees to give ease in walking. In khaki, same pattern breeches as for Field Artillery, of Bedford cord.

Sam-Brown belt and scabbard.—Universal pattern, of brown leather. Scabbard to have a bright steel shoe (shaped as in R.A. scabbard), a steel rimmed head, and a small leather tongue to attach to button on frog.

Sword knot.—Regimental size, of flat brown leather, but with leather tassel in lieu of acorn.

Boots.—Brown leather, shooting pattern, similar somewhat in appearance to those of the rank and file.

Gaiters.—Brown leather, cut like box cloth gaiters, and brown horn buttons (of the same number as in vogue in civil life). N.B.—Most officers think the gaiters should be of similar pattern to the men's.

Binoculars.—Private pattern, in a brown leather case. (Although private pattern is allowed, the case is in most batteries a regimental pouch, but of brown, instead of black leather, and with two leather loops on inner side of pouch to slide on to right side of Sam-Brown waist-belt).

Spurs.—Hunting pattern, straight neck, $1\frac{1}{4}$ in. long, with steel foot chain and brown leather instep strap. (Spurs are rarely worn in Mountain Battery Uniform except for mounted duties by officers).

Gloves.—Brown leather.

Field service cap.—As for other branches. (Forage cap is never worn, but must be kept up).

Khaki field service cap, putties, revolver, water-bottle, and *haversack.*—As for other branches of the Regiment on active service.

This dress is worn by officers, when parading with their men, on all occasions, other than church parade or review order, and on all garrison duties and boards in the station—except those in which officers of the Garrison Artillery would wear the tunic. On these occasions, and under any circumstances not specified above, the dress of the Mounted Garrison Artillery officer is worn.

Mountain Battery Chargers (Cobs) in India must be between 13h. 3in., and 14h. 1 in. in height. At home the limits should be between 14h. 1 in. and 14h. 3 in. Mules should not exceed 14 h. 2 in. in height.

ARTILLERY MOBILISATION.

BY

MAJOR F. G. STONE, R.A.

CHAPTER I.

The term "mobilisation" is so frequently used in a somewhat loose sense that it will be as well to define with some precision exactly what is meant officially by this word before proceeding to discuss its application to the artillery.

"Mobilisation" means briefly the transition of the component parts of an army, from a peace to a war footing, so that they may be complete in all respects—men, horses, vehicles, arms, ammunition, equipment, stores, &c., and in readiness to take their place "in the order of battle."

In some cases certain component parts do not exist, as such, in peace time, and have to be called into existence on mobilisation.

To thoroughly understand every detail of procedure, on mobilisation being ordered, may be looked upon as the first duty of every Commanding and Staff Officer; and it is important to remember that the regulated procedure on mobilisation is an immense measure of decentralisation, the magnitude of which is even now, scarcely brought home to all; it is only by a careful study of the regulations bearing on the subject, and questioning oneself closely as to how one would proceed on receiving the order to "mobilise," that we can arrive at a clear idea of how the machinery for mobilisation is called into existence or set in motion.

The success of our mobilisation as a whole depends entirely on the thoroughness with which all officers concerned grasp the nature of the duties which will fall to them; and inasmuch as such duties have but little connection with the routine duties, and can be but very imperfectly rehearsed in peace time, it is a matter of vital importance that the subject should be studied so closely, that when the critical time arrives everyone may know exactly what he will have to do.

Mobilisation causes a partial dislocation of peace administration, owing to the difference between the organisation of commands for peace and war, the immense increase of work which will suddenly be thrown upon existing staffs, and the strangeness to their duties and to each other of the officers who compose newly created staffs: under these circumstances it is clear that mobilisation is not a time to ask questions, but rather a time when every officer's administrative knowledge and organising capacity should suffice for his own immediate sphere of action.

In order to follow out the questions in connection with artillery mobilisation, it is desirable to obtain, in the first instance, a thoroughly comprehensive view of the organisation of our military forces for defence and offence; we shall thus be enabled to understand at once the part which each branch is destined to play on mobilisation for home defence or foreign service.

The troops at our disposal in the United Kingdom, excluding depôts, are :—

Regulars	21	Cavalry Regiments.
	9	Batteries Horse Artillery.[1]
	38	„ Field „
	20	Companies Garrison „
	27	„ Royal Engineers.
	72	Battalions Infantry.
	38	Companies Army Service Corps.
Militia	32	Regiments Artillery.
	10	Corps Engineers.
	128	Battalions Infantry.
Volunteers	67	Regiments Artillery.
	28	Corps Engineers.
	212	Battalions Infantry.
Yeomanry	39	Regiments.
Volunteers		Light Horse, 2 Regiments.

In addition to the above there are certain departmental troops which have not been enumerated, and 16 ammunition columns.

From the forces above enumerated, together with reserves (about 76,500), provision is made for the following services:—

1. A field army consisting of four Cavalry Brigades and three Army Corps, as detailed in the Regulations for Mobilisation for Home Defence. The I. and II. Army Corps are composed almost exclusively of Regulars, while the III. Army Corps has a proportion of Militia Infantry.

   The Cavalry Brigades and Army Corps are composed as laid down in Field Army Establishments Home Defence, and the distribution of the artillery and ammunition columns is as follows:—

	Each Cavalry Brigade.	Each Infantry Division.	Each A.C. Corps Troops.	Additional for 1st Army Corps.	Total for 4 Cavalry Brigades, and 3 Corps.
Horse Batteries	1	—	2	1	11
Field „	—	3	3	—	36
Ammunition Columns	1	1	1	—	16

2. A reserve Field Army, consisting of 22 Infantry Volunteer Field Brigades and 32 Artillery Volunteer Corps comprising—

   37 Batteries of 16-prs. R.M.L. (4 guns).
   12 „ 20-prs. „ „
   30 „ 40-prs. R.B.L. „

   allotted in accordance with Mobilisation Tables for Home Defence, Appendix L.

3. Local Defence, in accordance with Local Schemes of Defence, based on the allotment of troops given in confidential Mobilisation Tables for Home Defence—Garrisons.

[1] Two Depôt Batteries are also organised.

4. Unallotted units, available for any special service that may be required. The detail is given in regulations for Mobilisation Home Defence, Appendix G.
5. Field Force for service abroad. This force consists practically of the Aldershot Division, and is composed as follows:—
   2nd Division for Home Defence.
   2nd Cavalry Brigade for Home Defence.
   Additional Units.
   Base and Line of Communication Troops.

   The Cavalry Brigade has two batteries of R.H.A., instead of one allotted to it. Full details are given in Mobilisation Tables—Service Abroad—Field Force, published in November 1893.

With regard to the foregoing categories, it may be observed that the first four are for Home Defence, and the last (No. 5) for foreign service; moreover, that No. 1 embraces No. 5.

Scheme of Defence for the United Kingdom.

The principles which guided the framers of our scheme of defence are based on the following postulates:—

1. That an invader's objective is London, and that until London is taken no invasion can be considered entirely successful.
2. That it is essential to prevent an invader from seizing any important fortified ports or commercial harbours, which would give him an initial advantage.
3. That after having due regard to 2, our forces must not be frittered away by extending them in a long chain of guard posts all along the coast, with the idea (impossible to carry out) of preventing a landing at any point: but that our forces must be concentrated and mobile and capable of striking a blow, wherever and whenever the invader can be met, to the best advantage *after* a landing has been effected.

Foreign Expeditions.

The field force mentioned in category 5 above, is kept in constant readiness for service in any part of the world: it consists roughly of 20,000 men of all arms. "Should it be necessary to send a whole army corps abroad, the First Army Corps for home defence (as detailed in appendix E, Mobilisation Regulations, 1892) will be taken, and the few modifications necessary to bring it up to the establishment for service abroad will be made. Special arrangements will also be made with regard to the additional equipment required."[1]

Explanation of Terms Used.

The following terms are used in connection with mobilisation:—

Mobilisation Stores comprise all articles of equipment (including vehicles) in the possession of the Ordnance Store Department with a view to mobilisation. It also includes the equipment kept for the Army Reserve by Officers Commanding Regimental Districts.

Station Equipment comprises all articles of equipment kept by a unit with a view to its own mobilisation.

[1] Storage of Mobilisation Equipment for service abroad, A.O. 127, July, 1893.

Personal Equipment consists of the arms and accoutrements of the soldier.

The Personal Outfit of the soldier, consists of the *personal equipment*, plus *clothing and necessaries*.

First Regimental Equipment of the unit consists of cooking utensils, butchery implements, harness and saddlery, entrenching tools, &c., and the vehicles in which they are carried.

Second Regimental Equipment of the unit consists of the mobilisation supply of ammunition, the vehicles in which this is carried, supply wagons, ambulance wagons and water-carts.

Unit is a Battery of Horse, Field or Mountain Artillery, a company of Garrison Artillery, an Ammunition Column, the District Establishment R.A. in a military district, Regimental Staff of Corps Artillery, and a regiment of Militia or Volunteer Artillery &c.

Place of Mobilisation of a unit, is the place where the unit is brought to its war establishment of officers and men, and where its personal and first regimental equipment are kept in mobilisation storehouses: it is in nearly all cases, the peace station of the unit.

Place of Concentration is the place where a unit of the field army takes its station in the particular formation, *i.e.*, Brigade, Division or Army Corps to which it is assigned.

Reservist.—This term applies to Reserve men of the Regular Army, and does not include Militia Reserve men.

The following table shows the administrative machinery for dealing with reservists.

Corps or Unit.	Officer Commanding Reservists.	Officer Paying Reservists.	Place where Reservists join.
R.HA. and Riding Establishment	O.C. Depot R.H.A., Woolwich	Station Paymaster, Woolwich	As ordered by D.-A.-G., R.A.
Field Artillery — 1st to 20th Battery	O.C. 1st Battery 1st Depot Div. Woolwich	do.	do
Field Artillery — 21st to 40th Battery	O.C. 2nd Battery 1st Depot Div. Woolwich		
Field Artillery — 41st to 60th Battery	O.C. 1st Battery 2nd Depot Div. Woolwich		
Field Artillery — 61st to 80th Battery	O.C. 2nd Battery 2nd Depot Div. Woolwich		
Ammunition Columns. — 1, 2, 3, 4 & 8,	O.C. Depot R.H.A. Woolwich		
Ammunition Columns. — 5, 7, 9, 11, 12, & 14	O.C. 1st Depot Div. Woolwich		
Ammunition Columns. — 6, 10, 13, 15, & 16	O.C. 2nd Depot Div. Woolwich		
Mountain Artillery	O.C. Depot Western Div. R.A. Devonport	Station Paymaster, Devonport... ...	Depot Western Div. R.A. Devonport.
Garrison Artillery, including District Establishment	O.C. Depot of Div. to which the Reservist belongs	Station Paymaster Paying Depot of Reservist's Div.	Depot of Div. to which Reservist belongs.
Regimental District Staff School of Gunnery Detachment at Shoeburyness.	O.C. Depot Eastern Div. R.A. Dover	Station Paymaster, Dover	Depot Eastern Div. R.A., Dover.

PROCEDURE ON MOBILISATION COMMON TO ALL REGULAR UNITS.

Officers commanding units will on receipt of the order to mobilise:—

(*a.*) Inform all officers and soldiers on leave.

(*b.*) Arrange for medical inspection of officers and men.

(*c.*) Telegraph to the Military Secretary the number of officers of each rank required to complete to War Establishment, after deducting those unfit for serice, or not available through being detailed for other duties.

(*d.*) In case any men are on command and cannot be spared to rejoin their unit, telegraph to Officer Commanding Reservists. This telegram should also include the casualties which have occurred since the rendering of the biennial return, due on 15th June and 15th December (*see* list of returns).

(*e.*) Arrange for receiving, accomodating in barracks, tents, hired buildings or billets, equipping and arming reservists, as they arrive from the depôts; and also for the accommodation of detachments called in from out stations. It may be noted that a comprehensive scheme for accommodating men who are thus called up on mobilisation, is under consideration for each district.

(*f.*) Draw from the Ordnance Store Department at the station the arms and accoutrements for the reservists and (if not already on charge) the mobilisation stores for the first regimental equipment of the unit.

(*g.*) Arrange for the accommodation of the additional horses required for War Establishment.

(*h.*) On receipt of instructions from the Inspector General of Remounts, send a collecting party, at the rate of one man to every two horses, with a proper proportion of officers, non-commissioned officers, and shoeing-smiths (when practicable) with head-collars, head-ropes, T bits and nose-bags to the remount centre indicated in the mobilisation tables, to receive the horses and return with them to the unit. This party will take with them any unfit horses of the unit that can travel, and hand them over to the Remount Officer with Army Form B. 88, and Veterinary History Sheets. Horses unfit to travel will be disposed of locally or destroyed.

(*i.*) Arrange for fitting harness and saddlery as soon as party returns with horses.

(*j.*) Send to the Depôt, all officers and men who are temporarily unfit to travel.

(*k.*) Send to their homes, or place of residence they may select in the United Kingdom, all soldiers wives and families, except those of men proceeding to the depôts, who will accompany the men.

(*l.*) As soon as the unit is ready to proceed to its place of concentration, telegraph to the general officer commanding in the district for instructions.

It is obvious that some of the foregoing instructions apply only to units of the mounted branches, viz :— Horse and Field Batteries and Ammunition Columns : and it may be observed that the only mounted units which are not allotted to the Field Army, are the two Field Batteries at Athlone and the four Field Depôts at Woolwich.

The mobilisation equipment for the Garrison Companies consists only of the personal outfit of the soldier, of ammunition, and the barrack or camp equipment required. The personal outfit is provided in the same way as for Horse and Field Artillery, the ammunition, barrack or camp equipment, tools, &c. are stored and issued at the station which forms the place of concentration for the company.

Duties of Officers Commanding Reservists.

On receipt of the order to mobilise, Officers Commanding Reservists will—

(*a.*) Arrange with municipal, parochial, and police authorities, and postmasters for causing placards (Army Form D. 427 or 451) to be posted without delay on the doors of Town Halls, Churches and Chapels, Police Barracks, Military Barracks, and in the windows of Post Offices.

(*b.*) Inform all officers and soldiers on leave.

(*c.*) Arrange for medical inspection of all officers and soldiers serving at the depôts and of all reservists as they join.

(*d.*) Arrange for receipt and care of clothing and necessaries for reservists. These will be despatched direct from Pimlico: the amount sent will be based on the total number of reservists ordered to join, and demands will not be required. The special articles of clothing and necessaries (flannel belt, pots of grease, housewives, field dressings) which are required on mobilisation but do not form part of the peace kit, will be forwarded from Pimlico to Officers commanding units, the numbers being calculated in each case on the war establishment of the unit.

(*e.*) Arrange for receiving, accommodating (in barracks, hired buildings, tents or billets[1]) the Reservists as they join.

(*f.*) See that Reservists are settled up with, to the day preceding joining, for their Reserve Pay and Reserve Deferred Pay, minus any forfeitures, stoppages, or advances.

(*g.*) Record the absence without leave of such Reservists as fail to report themselves in accordance with Sections 19 to 24 (3) of the Reserve Forces Act 1882.

(*h.*) Ascertain whether Reservists are married or not, or widowers with children: in case the statement made by the Reservist does not correspond with any entry in his documents, a declaration must be made on Army Form D. 418, and passed to the officer paying the Reservist.

(*i.*) Arrange for the accommodation of men and soldiers' families sent to the Depôts from the affiliated units.

[1] It may not be generally known that it is illegal to billet troops on any of the civilian population except licensed victuallers.

Reservists will be sent to units from the Depôts as soon as they are clothed and supplied with necessaries.

Duties of Officers Paying Reservists.

On receipt of the order to mobilise, an officer paying Reservists will—

(*a.*) Complete and send in one envelope (Army Form D. 457) by post to each Reservist.

(i.) Notice on Army Form D. 463, signed by him for the Officer Commanding Reservists; with Postal Order for 3s. attached.

(ii.) Railway and passage warrants for the journey from Reservist's home to Depôt.

(*b.*) On the despatch of each batch of Reservists from the Depôt to the unit to which they are allotted by the Officer Commanding Reservists, forward to the unit concerned by the conducting officer, or by post if there is no conducting officer—

(i.) Nominal roll of the party, as furnished by the Officer Commanding Reservists.

(ii.) Army Form O. 1811 for each Reservist.

The Reserve documents will be forwarded at the same time by the Officer Commanding Reservists to the unit concerned.

Command on Mobilisation.

Units allotted to the Field Army will remain under the General Officer Commanding the District in which they are until they leave their place of mobilisation, *en route* for their place of concentration.

On leaving their place of mobilisation they will at once be considered as belonging to the Field Army, and will come under the command of their respective Generals.

Units allotted to garrisons will similarly pass under the command of the Officer Commanding the Garrison to which they are allotted on leaving their peace station for their war garrison. Unallotted units will remain under the command of the General Officer Commanding the District in which they are stationed.

The foregoing remarks are of more or less general application as regards the Regular Service; and it only remains, before going into details affecting the different branches of the artillery service, in a more or less special manner, to explain the provision made for the families of soldiers on mobilisation. Section 3, para. 94, Allowance Regulations provides that—"When troops are ordered to embark for service abroad, without their families, the latter, if on the married establishment, will be sent to their homes, where they will receive the following daily allowances from date of embarkation :—

	If accommodated in barracks.	If not accommodated in barracks.
Wife	4d.	8d.
Each girl under 16...	1½d.	2d.
„ boy „ 14...	1½d.	2d.

Allowances at the same rates are issuable to the families sent to the

place of residence they may select in the United Kingdom on Mobilisation for Home Defence."

The Militia and Militia Reserve are on the same footing as the Regulars; in fact, the latter body is practically an Army Reserve recruited from the Militia.

The Volunteers also enjoy precisely the same privileges as the Regulars, on Mobilisation, their status is clearly defined in Section 17 of the Volunteer Act of 1863.

We will now examine in detail the status of the

RESERVISTS.

For all practical purposes Reservists belong either to—

(*a.*) The 1st Class Army Reserve; or,
(*b.*) The Militia Reserve.

In order to understand the procedure on Mobilisation, it is important to understand exactly the constitution of these two bodies.

The 1st Class Army Reserve[1] consists of four sections:—

Section A. is composed of discharged soldiers who have served for not less than three years in the Army, not discharged for misconduct, and under 34 years of age. The term of service is for five years. No enlistments into this section are at present permitted.

Section B. is composed of soldiers who, having completed the period of Army Service for which they originally enlisted, complete in the Army Reserve their first period of limited engagement. This section also includes soldiers who, before completing their term of Army Service (enlisted for short service) have been permitted to convert the remainder of their Army Service into Reserve Service: these men pass into Section C. until their Army Service and Reserve Service together amount to the full term of their original engagement for Army Service, after which they are transferred to Section B.

Section C. consists of men whose residue of Army Service has been converted into Reserve Service.

Section D. is a supplemental reserve, and is composed of men who have completed their first period of limited engagement, either with the colours, or in Section B. or C. of the 1st Class Army Reserve: the term of service is four years.

The Militia Reserve consists of such number of men as may from time to time be determined by Parliament: at present a Militia Regiment may enlist men for the Militia Reserve to the extent of one-third its enrolled strength. A man may be enlisted for the Militia Reserve for six years or for the residue of his Militia engagement.[2]

A Militia Reserve man is practically a militiaman who, in consideration of a bounty, takes upon himself the obligations of a Reservist, liable to be called upon to serve in the regular army: he can be appointed to any corps and transferred within three months to any other corps.[3] A man in the Militia Reserve remains for all purposes a

[1] Regulations for the 1st Class Army Reserve, 1893.
[2] Reserve Forces Act, 1882, sections 8 and 9.
[3] "Manual of Military Law." Constitution of the Forces, Chap. XI., para. 30.

militiaman until called out for permanent service: when so called out his place in the militia is considered vacant, and is to be filled up.

It is evident that "Calling out the Reserves" does not necessarily imply calling out the whole of the Reserves, and that the War Office must decide when the occasion arises, as to what class or classes of the Reserve are to be called out, or to what extent any particular class shall be called out—*i.e.*, whether men with one, two, or three years or more of unexpired Reserve Service shall be exempted.

The Militia Reserve may be called out before the Army Reserve is touched; but it has been decided that in the event of Mobilisation for Home Defence, the Militia Reserve men will remain with their Militia units. In spite of this, however, we must remember that at the beginning of a war, which did not appear to warrant complete mobilisation, the Militia Reserve might be called upon to furnish drafts for the Garrison Artillery, and that subsequent events might necessitate complete mobilisation, which would then have to be carried out with a reduced strength of Militiamen, notwithstanding the decision above-mentioned. The contingency, however, is a very remote one as regards the artillery, and, owing to the fact that it would affect the Garrison Artillery, which is maintained at war strength in peace time, there is very little prospect of any dislocation in existing arrangements for mobilisation.

We will now pass to a more detailed consideration of each branch of the artillery, taking them seriatim in the following order:—

(i.) Royal Horse and Field Artillery, and Staffs.
(ii.) Ammunition Columns.
(iii.) Garrison Artillery (R.A.)
(iv.) Militia Artillery.
(v.) Volunteer Artillery.

CHAPTER II.

I.—Royal Horse and Field Artillery.

No Batteries of Horse or Field Artillery are allotted to garrisons, the whole of them are allotted to the Field Army for Home Defence (which includes the Field Force for Service Abroad) with the following exceptions:—

(*a.*) The Field Artillery Depôt Batteries.
(*b.*) The two Field Batteries at Athlone, which are "unallotted."

The Field Artillery Depôts will not be mobilised for service, and no additional equipment is therefore provided; they will be fully occupied in carrying out administrative duties in connection with the mobilisation and feeding of the Service Batteries and Ammunition Columns.

The following table shows the allotment of Horse and Field Batteries, Ammunition Columns, and R.A. Staffs, both for the Field Force for Service Abroad and the Field Army for Home Defence. This table gives the allotment by stations and not by units in the case of the Batteries and Ammunition Columns, as the designation of the units is constantly changing, whereas the number and nature of the units at each station (except during relief) is always the same. The staffs are formed on mobilisation, and do not exist as units in peace time; the

personnel of the staffs is communicated in peace time to General Officers concerned, but is naturally subject to variation, and is kept strictly confidential as regards the officers. The N.-C.O.'s and men are detailed by rank according to requirements, to be furnished by various units; it rests with the Officers Commanding the Units to detail the N.-C.O.'s and men required by name. Further details on this point will be given later on.

MOBILISATION TABLES FOR HOME DEFENCE.

HORSE AND FIELD ARTILLERY, AMMUNITION COLUMNS AND R.A. STAFFS.

	Detail.	Station and Place of Mobilisation, where Personal, 1st Regimental and Station Equipment is kept.	Centre from which Horses will be drawn.
Cavalry Brigades.	1st Cavalry Brigade. — 1 Battery R.H.A....	Aldershot.	Aldershot.
	1st Cavalry Brigade. — No. 1 Ammunition Column.	Aldershot.	Aldershot.
	2nd Cavalry Brigade. — 1 Battery R.H.A....	Aldershot.	Aldershot.
	2nd Cavalry Brigade. — No. 2 Ammunition Column.	Aldershot.	Aldershot.
	3rd Cavalry Brigade. — 1 Battery R.H.A....	Dublin.	Dublin.
	3rd Cavalry Brigade. — No. 3 Ammunition Column.	Dublin.	Dublin.
	4th Cavalry Brigade. — 1 Battery R.H.A....	Dublin.	Weedon.
	4th Cavalry Brigade. — No. 4 Ammunition Column.	Weedon.	Weedon.
1st Army Corps Troops.	1st Infantry Division. — 1 Field Battery R.A.	Woolwich.	Woolwich.
	1st Infantry Division. — 1 Field Battery R.A.	Woolwich.	Woolwich.
	1st Infantry Division. — 1 Field Battery R.A.	Woolwich.	Woolwich.
	1st Infantry Division. — No. 5 Ammunition Column.	Caterham.	Woolwich.
	2nd Infantry Division. — 1 Field Battery R.A.	Aldershot.	Aldershot.
	2nd Infantry Division. — 1 Field Battery R.A.	Aldershot.	Aldershot.
	2nd Infantry Division. — 1 Field Battery R.A.	Aldershot.	Aldershot.
	2nd Infantry Division. — No. 6 Ammunition Column.	Aldershot.	Aldershot.
	3rd Infantry Division. — 1 Field Battery R.A. (*a*). ...	Newbridge.	Dublin.
	3rd Infantry Division. — 1 Field Battery R.A. (*b*). ...	Newbridge.	Dublin.
	3rd Infantry Division. — 1 Field Battery R.A. (*c*). ...	Newbridge.	Dublin.
	3rd Infantry Division. — No. 7 Ammunition Column.	Caterham.	Woolwich.
	Corps Troops. — Corps Artillery Staff	Woolwich.	Woolwich.
	Corps Troops. — 1 Battery R.H.A....	Woolwich.	Woolwich.
	Corps Troops. — 1 Battery R.H.A....	Woolwich.	Woolwich.
	Corps Troops. — 1 Battery R.H.A....	London.	Woolwich.
	Corps Troops. — 1 Field Battery R.A.	Hilsea.	Woolwich.
	Corps Troops. — 1 Field Battery R.A.	Hilsea.	Woolwich.
	Corps Troops. — 1 Field Battery R.A.	Christchurch.	Woolwich.
	Corps Troops. — No. 8 Ammunition Column.	Caterham.	Woolwich.
2nd Army Corps Troops.	4th Infantry Division. — 1 Field Battery R.A.	Weedon.	Weedon.
	4th Infantry Division. — 1 Field Battery R.A.	Weedon.	Weedon.
	4th Infantry Division. — 1 Field Battery R.A.	Coventry.	Weedon.
	4th Infantry Division. — No. 9 Ammunition Column.	Warley.	Weedon.
	5th Infantry Division. — 1 Field Battery R.A.	Newcastle.	Weedon.
	5th Infantry Division. — 1 Field Battery R.A.	Newcastle.	Weedon.
	5th Infantry Division. — 1 Field Battery R.A.	Tilbury.	Weedon.
	5th Infantry Division. — No. 10 Ammunition Column.	Tilbury.	Weedon.
	6th Infantry Division. — 1 Field Battery R.A.	Colchester.	Weedon.
	6th Infantry Division. — 1 Field Battery R.A.	Colchester.	Weedon.
	6th Infantry Division. — 1 Field Battery R.A.	Colchester.	Weedon.
	6th Infantry Division. — No. 11 Ammunition Column.	Colchester.	Weedon.
	Corps Troops. — Corps Artillery Staff	Ipswich.	Weedon.
	Corps Troops. — 1 Battery R.H.A....	Aldershot.	Weedon.
	Corps Troops. — 1 Battery R.H.A....	Dorchester.	Weedon.
	Corps Troops. — 1 Field Battery R.A.	Ipswich.	Weedon.
	Corps Troops. — 1 Field Battery R.A.	Ipswich.	Weedon.
	Corps Troops. — 1 Field Battery R.A.	Glasgow.	Weedon.
	Corps Troops. — No. 12 Ammunition Column.	Warley.	Weedon.

(*a*) Temporarily at Clonmel, Station Equipment at Queenstown.
(*b*) " " Limerick, " " " "
(*c*) " " Fermoy.

MOBILISATION TABLES FOR HOME DEFENCE.—*Continued.*

HORSE AND FIELD ARTILLERY, AMMUNITION COLUMNS AND R.A. STAFFS.

	Detail.	Station and Place of Mobilisation, where Personal, 1st Regimental and Station Equipment is kept.	Centre from which Horses will be drawn.
3rd Army Corps Troops.	7th Infantry Division. 1 Field Battery R.A.	Exeter.	Woolwich.
	7th Infantry Division. 1 Field Battery R.A.	Exeter.	Woolwich.
	7th Infantry Division. 1 Field Battery R.A.	Trowbridge.	Woolwich.
	F 7th Infantry Division. No. 13 Ammunition Column.	Chatham.	Woolwich.
	8th Infantry Division. 1 Field Battery R.A.	Aldershot.	Aldershot.
	8th Infantry Division. 1 Field Battery R.A.	Aldershot.	Aldershot.
	8th Infantry Division. 1 Field Battery R.A.	Aldershot.	Aldershot.
	F 8th Infantry Division. No. 14 Ammunition Column.	Chatham.	Aldershot.
	9th Infantry Division. 1 Field Battery R.A.	Shorncliffe.	Aldershot.
	9th Infantry Division. 1 Field Battery R.A.	Shorncliffe.	Aldershot.
	9th Infantry Division. 1 Field Battery R.A.	Shorncliffe.	Aldershot.
	9th Infantry Division. No. 15 Ammunition Column.	Chatham.	Aldershot.
	Corps Troops. Corps Artillery Staff	Woolwich.	Woolwich.
	Corps Troops. 1 Depôt Battery R.H.A. ...	Woolwich.	Woolwich.
	Corps Troops. 1 Depôt Battery R.H.A. ...	Woolwich.	Woolwich.
	Corps Troops. 1 Field Battery R.A.	Sheffield.	Woolwich.
	Corps Troops. 1 Field Battery R.A.	Sheffield.	Woolwich.
	Corps Troops. 1 Field Battery R.A.	Longford.	Woolwich.
	Corps Troops. No. 16 Ammunition Column.	Chatham.	Woolwich.

Units marked F in the foregoing tables are detailed for the Field Force for Service Abroad. The following table shows the distribution of the artillery in the Field Force for Service Abroad:—

With Infantry Division—

3 field batteries ... ... } as detailed for 2nd Division for
No. 6 ammunition column... } home defence.

With Cavalry Brigade—[1]

2 R.H.A. Batteries—as detailed for 1st and 2nd Cavalry Brigades for home defence.

Ammunition Column—formed on the cadres of Nos. 1 and 2 Ammunition Columns.

With extra units to accompany Field Force—

No. 1 section Ammunition Park—formed on the cadre of No. 13 Ammunition Column.

No. 2 section Ammunition Park—formed on the cadre of No. 14 Ammunition Column.

Completing Units of the Field Army to War Strength.

It has already been shewn in the table giving the administrative machinery for dealing with reservists, that they will be posted to artillery units of the Field Army under the orders of the Deputy-Adjutant-General, R.A.

These orders are contained in Horse Guards W.O. letters R.A. | misc. | 6484, 14th July, 1891, and 21st February, 1893, and provide as follows for home defence:—

[1] The Brigade Staff of the Cavalry Brigade will be as laid down in Field Army Establishments, Service Abroad, but with the addition of one Lieut.-Colonel and one adjutant R.H.A.; and four rank and file.

The authorised establishments for Horse and Field Batteries are—

Battery.	B.S.M.	B.Q.M.S.	Sergeants.	Corporals.	Bombardiers.	Trumpeters.	Gunners.	Drivers.	S. Farrier.	Shoeing-Smiths.	Collar-Makers.	Wheelers.	Total.
Royal Horse Artillery ...	1	1	6	6	6	2	74	68	1	5	2	2	174
Field Artillery	1	1	6	6	6	2	76	59	1	4	2	2	166

Under the direction of the Officer Commanding Horse and Field Artillery, Woolwich, gunners and drivers to the number required, will be posted either from the respective depôts, or from the First Class Army Reserve. As regards N.-C.O.'s and artificers, any reservists surplus to the requirements of the Ammunition Columns, will be allotted to stations under the orders of the above-named officer.

On mobilisation, the Officer Commanding R.A. at each station will be supplied direct from the depôt with a list of N.-C.O.'s and men (reservists) told off to his station, showing rank on transfer. This officer will immediately on its receipt, post them to batteries under his command. The reservists will in the first instance join their respective depôts at Woolwich (under instructions from the Station Paymaster), where they will receive their clothing and necessaries, from the officers commanding depôt divisions (see para. 28 Regulations for the 1st Class Army Reserve). After being clothed and settled up with, they will be despatched to their stations with the least possible delay.

There will probably not be sufficient N.-C.O.'s and artificers in the Army Reserve to meet requirements; any deficiency is to be met by promotions to be made on mobilisation from amongst the batteries at the station, to be carried out by the Officer Commanding R.A. at such station.

In addition to the above a proportion of N.-C.O.'s and artificers will be required on mobilisation to complete the Ammunition Columns, and a detailed table in the following form :—

Designation of Column.	Station of Column.	To be furnished by Batteries at

issued by the Deputy-Adjutant-General, R.A., to the Officer Commanding Horse and Field Artillery, shows how the duty of filling up these vacancies is divided among the batteries at home.

Acting on the foregoing instructions, the Officers Commanding the Depôt Divisions at Woolwich, issue instructions in the following form to Officers Commanding Artillery at various stations, which are within there respective administrative spheres :—

"The following detail by ranks will have to be found by promotion, in the batteries under your command, to complete them to mobilisation strength and also to complete the ——— Ammunition Column."

SPECIMEN TABLE.

To Complete Batteries.		To Complete Ammunition Column.	
Battery Sergeant-Majors	—	Battery Sergeant-Majors *...	1
Battery Q.M. Sergeants ...	—	Battery Q.M. Sergeants *...	1
Sergeants	2	Sergeants	4
Corporals	3	Corporals	—
Sergeant Farriers	—	Sergeant Farriers	1
Shoeing-Smiths	4	Shoeing-Smiths.....	—
Collar-Makers	—	Collar-Makers	3
Wheelers	3	Wheelers	2
Trumpeters	—	Trumpeters	2

* To be filled up under the orders of the Officer Commanding Horse and Field Artillery, Woolwich.

The case of the Battery Staff Sergeants must be considered with reference to regimental seniority.

The above provisions are to meet the case of complete mobilisation for home defence: if the mobilisation is only a partial one, such as would be the case if it were merely required to mobilise the Field Force for Service Abroad, the case of all N.-C.O.'s and artificers would have to be dealt with specially, in accordance with the numbers of N.-C.O.'s and artificers available among the reservists of the year or class which it might be decided to call out, and this would be done when the occasion arose, under the orders of the Officer Commanding Horse and Field Artillery at Woolwich.

The requirements of the Regimental Staffs are similarly dealt with by the O.C. Horse and Field Artillery, under the orders of the Deputy-Adjutant-General, R.A.[1]

Horse and Field Battery Establishments, Service Abroad.

The establishments of Horse and Field Batteries for Service at Home has been given above in accordance with Field Army Establishments: there is very little difference in the establishments for Service Abroad, the difference being due to the addition both in Horse and Field Batteries of one artillery wagon for reserve rations, and one ammunition and store wagon for tents, necessitating an increase of five drivers in a Horse Battery and four drivers in a Field Battery: the fact that there are five drivers additional in a Horse Battery as against four in a Field Battery is due to the fact that the extra wagon (ammunition and store) for supplies in the Horse Battery has three pairs of horses, whereas in a Field Battery it has only two pairs.[2]

Equipment.

"Mobilisation Store Tables" are issued to officers commanding all units: these tables vary considerably, according to the peace establishment of batteries, and also in minor details, according to whether they are in possession of Mark I. or Mark II. Equipment. The batteries at Aldershot on the highest peace establishment are supplied with special tables for Service Abroad.

The Mobilisation Store Tables are compiled from the Equipment

[1] Mobilisation Regulations, Home Defence, para. 86.
[2] "Field Army Establishments, Home Defence," pp. 50 and 54. "Field Army Establishments, Service Abroad," pp. 48 and 52.

Regulations, and show at a glance the equipment as regards every article on battery charge for—

(i.) War establishment, at home or abroad, as the case may be.
(ii.) Peace establishment.
(iii.) Battery Station Equipment.
  (*a.*) Establishment.
  (*b.*) In possession on 1st April.

The figures in columns 2 and 3, added together, agree with the figures in column 1. In other words, every battery has on charge its full war equipment, either as "Peace" or "Battery Station" Equipment.

Without going into details, it will be well to obtain a general idea of the difference between batteries on the various establishments in regard to guns and vehicles; harness, saddlery, and small stores of every description, as well as ammunition, are practically governed in regard to distribution, by the number of carriages or vehicles shown as "Peace" or "Battery Station" Equipment.

	War Establishment.			Peace Establishment in use.							Battery Station Equipment.						
	Home Service.		Service Abroad.														
	R.H.A. and Field Batteries, Highest Establishment at Aldershot. R.H.A. 4-gun.	Other Batteries.	All Batteries.	R.H.A. Highest Establishment, Aldershot.	R.H.A. 4-gun Battery.	R.H.A. Depots, Woolwich.	Field Artillery Highest Establishment, Aldershot.	Field Battery Highest Establishment, Not at Aldershot.	Field Battery. Medium.	Field Battery. 4-gun.	R.H.A., Aldershot.	R.H.A. 4-gun Battery.	R.H.A. Depot.	Field Battery, Aldershot.	Field Battery Highest Establishment.	Field Battery. Medium.	Field. 4-gun Battery.
	1	2	3	4	5	6	7				1	2	3	4	5	6	7
Ordnance 12-pr. B.L. with carriages	6	6	6	6	4	6	6	6	6	4	...	2	...	...	...	...	2
Ammunition and Store, R.A. ...	2	1	2	1	1	1	1	1	1	1	1	1	...	1	...	...	...
Ammunition, B.L. 12-pr.	6	6	6	1	1	...	6	...	3	...	5	5	6	...	6	3	6
Artillery	2	2	3	...	...	...	...	...	...	...	3	2	2	3	2	2	2
Forge, R.A. ...	1	1	1	...	...	...	...	...	...	...	1	1	1	1	1	1	1
Store, R.A. ...	1	1	1	...	...	...	...	...	...	...	1	1	1	1	1	1	1

Storage of Station Equipment.

The "Regulations for the Disposition and Packing of Mobilisation Stores" issued with Army Orders, dated 1st September, 1893, contain full information on this point.

With very few exceptions (*e.g.* Clonmel and Limerick) the Battery Station Equipment is now on charge of the Officer Commanding the

Battery, and is accommodated in suitable buildings, re-appropriated or specially constructed for the stores and vehicles.

When a single shed contains the entire equipment (Peace and Station) of a battery, the Station Equipment should be kept separate from the Peace Equipment so far as circumstances permit.

Gun-carriages and ammunition wagons are to be kept packed, complete with all their stores, except cartridges: straps are to be tied up in sets, labelled, and locked up in the vehicle to which they belong.

In order to prevent excessive enterprise on the part of limber-gunners in search of a ready means of replacing some missing article of the Peace Equipment, it is desirable to have padlocks on the boxes of the Station Equipment vehicles, if they are kept in the same shed as the Peace Equipment vehicles: it is probable that orders will be issued on this subject.[1]

The turnover of the ammunition in the Station Equipment will be carried out by the Officer Commanding the Battery. As regards other stores, when new articles are required to replace unserviceable in the Peace Equipment, it should be stated on the requisition if the articles can be replaced from Station Equipment.

Vehicles and ammunition of Station Equipment will be examined annually by the Director of Artillery's Inspection Branch at the same time as the vehicles and ammunition of the Peace Equipment is carried out.

The entire Station Equipment will be inspected in January and July of each year by a Board consisting of the Lieut.-Colonel Commanding the Division of Artillery, the Officer Commanding the Battery, and the Senior Ordnance Store Officer.

Whenever a battery is inspected the Station Equipment will also be inspected.

The Battery Station Equipment is to be packed, horsed, and taken out once a quarter, to ensure its being kept in serviceable condition.[2] At a three Battery Station, or where a Lieut.-Colonel's Division is complete, this can be done by lending horses from one battery to another, with their drivers: in other cases, one section at a time can be taken out.[3] It may be observed in this connection that the largely increased charge now placed under the Battery Commander, by the addition of the Station Equipment, has not been accompanied by any increase in the establishment of N.-C.O.'s and men; this renders the work somewhat difficult to cope with, especially in the case of 4-gun batteries.

In the exceptional cases, where the Battery Station Equipment is on charge of the Ordnance Store Department, "the Senior Ordnance Store Officer will be responsible at all times for the completeness and fitness for service of the Battery Station Equipment: the Officer Commanding the battery will always have power to inspect his Battery

[1] This question has since been decided on Horse Guards, W.O. letter 54 | Artillery | 1843 | dated 30/3/94, as follows:—"It would appear that the necessary security of the small stores in the Station Equipment Carriages would be obtained, if these carriages are inspected as are those of the Peace Equipment."

[2] Equipment Regulations, Part II., Peace, Section XI., para. 17.

[3] It should not be used on any other occasion without special authority from the Adjutant-General. G.O. 1.8.93.

Station Equipment when in Ordnance Store charge, and ascertain its condition, on his notifying to the Ordnance Store Officer his intention to do so, in order that the latter officer or his representative may be present."[1]

There are many minor details which have to be attended to by the Officer Commanding the Battery before leaving his Peace Station, such as the securing of the soldier's description card (Army Form B. 2067)[2] in the skirt of the frock, the supply of books and stationery as per appendix VII., "Manual for Field Service," stamping leather labels for harness if the battery is ordered on foreign service, &c., &c., each of which is most important for the subsequent comfort of the battery; full details on such points are given in the Handbook and Manual for Field Service.

CHAPTER III.

Regimental Staffs.

The Regimental Staffs of Corps Artillery are detailed as follows:—

Officers.—By the Military Secretary.

N.-C.O.'s and men.—By the Deputy-Adjutant-General, R.A.: the *personnel*, as regards N.-C.O.'s and men, may consist partly of specially selected N.-C.O.'s detailed or appointed by the Deputy-Adjutant-General on mobilisation, and partly of N.-C.O.'s and men furnished from stations, on a detail given in peace time by the Officer Commanding Horse and Field Artillery, Woolwich, in the same way, as has already been explained, for mobilising Batteries and Ammunition Columns.

The R.A. Staff for the Artillery of the Infantry Divisions is included in the Divisional Staff.

On Mobilisation for Home Defence, the Colonel Commanding Corps Artillery will detail one of his officers to take over the equipment for the Staff: this equipment, including transport, is kept at the places given in the Mobilisation Tables (*see* pp. 278–9) by the Ordnance Store Departments; the officer who takes over the equipment and transport becomes an accountant; the Army Forms, books, &c., which he will require are included in the list given in Appendix VII., Manual for Field Service. The horses will be drawn at the places laid down in the Mobilisation Tables in the manner already described at p. 273, (*h*), under the head of Duties of Officers Commanding Units. The Colonel Commanding Corps Artillery will issue his own orders as to the assembly of his staff. In order to be able to mobilise the staff without delay or friction, it is obvious that any officer who has received confidential instructions that he will be in command of the Corps Artillery of one of the Army Corps, should also be in possession of the detail of his staff, and that he should be empowered to inspect the equipment and transport allotted to him.

The procedure on Mobilisation for Service Abroad is practically the

[1] Equipment Regulations, Part II., Peace, Section XI., as amended by A.O. April 1st, 1892, paras. 20 and 20c.

[2] Queen's Regulations, Sec. XII., para. 53.

same as above; there is, however, a very slight difference in the *personnel* and transport, which is shown in the following tables.

SUMMARY OF TRANSPORT.

	Vehicle.	Number.	Drivers.	Horses.	Remarks.
Service Abroad ...	Wagon Ammunition & Store R.A.	1	2	4	For tents, supplies, and baggage of staff.
Service at Home ...	Forage Cart	1	1	2	For supplies and baggage of staff.

DETAIL OF STAFF.

Regimental Staff.	Officers.		Staff-Sergts. (Clerks).		Rank & file.		Total.		Horses.			
									Private or provided under allowance regulations.		Public Draught.	
	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.
Colonel Comdg.												
Corps Artillery	1	1	1	1	2	2	7	7	3	3		
Adjutant	1	1	...	...	2	2			2	2		
Horse Artillery Div. Lieut.-Col. Comdg.												
Horse Artillery Div. 2 H.A. Batteries ...	1	1	1	1	2	2	9	10	3	3		
Horse Artillery Div. Adjutant, H.A. ...	1	1	...	...	2	2			3	3		
Horse Artillery Div. Medical Officer ...	1	1	...	...	...	...			2	2		
Horse Artillery Div. Veterinary Officer ...	1	2	...	...	...	...			2	4		
Field Artillery Div. Lieut.-Col. Comdg.												
Field Artillery Div. 3 Field Batteries and Corps Troops, Ammunition Column	1	1	1	1	2	2	10	10	2	2		
Field Artillery Div. Adjutant, R.A. ...	1	1	...	...	2	2			2	2		
Field Artillery Div. Medical Officer ...	1	1	...	...	...	...			1	1		
Field Artillery Div. Veterinary Officer ...	2	2	...	...	...	...			2	2		
Drivers	...	...	...	...	1	2	1	2			2	4
Total	11	12	3	3	13	14	27	29			2	4
	Home Service ... ... 27 Service Abroad 29								Home Service ... ... 24 Service Abroad 26			

Note.—Medical and Veterinary Officers are attached to units of the Corps Artillery for transport, servants, and supply; in note *e*, p. 39 Field Army Establishments Service Abroad, and same note, p. 41 Field Army Establishments Home Service.

The Colonel Commanding Corps Artillery would place himself in communication with Officers Commanding Batteries and Ammunition Columns, through the medium of the Lieut.-Colonels Commanding Horse and Field Artillery Divisions, as soon as mobilisation is ordered; by this means the chain of responsibility, and system of command to be adopted between the time the units leave their Peace Station and join at the place of concentration, will be at once established. It must be remembered that on the day a unit leaves its place of mobilisation (*i.e.*, Peace Station) it comes under the orders of the Officer Commanding the formation to which it is allotted in the Mobilisation Tables.

It will be necessary for the Colonel Commanding to inform the Lieut.-Colonels Commanding Horse and Field Artillery Divisions, how he wishes the staff mobilised and concentrated, and to issue orders for the guidance of the Medical and Veterinary Officers. These arrangements should all be cut and dried in peace time, and the orders to be issued or acted upon on mobilisation, drawn up beforehand. In many cases the various items which compose a staff on mobilisation are considerably scattered in peace time, and a feeling of confidence and cohesion will be established if the said items are definitely informed by their "mobilisation" chief, as to the course of action they are required to take on leaving their Peace Stations. In other words, the establishment of personal relations between the chief and his staff should be commenced before the items composing that staff leave their Peace Stations, instead of allowing them to turn up as they please at the place of concentration at all sorts of times, groping about for their head-quarters and endeavouring to elicit information from others who are as vague as themselves, and who will probably meet their enquiries with the time-honoured reply: "I'm a stranger in these parts myself."

We have now to consider the R.A. Staff of the Field Artillery Division of an Infantry Division. This Staff is not a separate unit like the Regimental Staff of the Corps Artillery, but is part and parcel of the Staff of an Infantry Division. The Staff of an Infantry Division is precisely the same whether for home service or service abroad, the only difference being in the attached details, viz.:—

	Home Service.	Service Abroad.
Army Service Corps.....	13 all ranks	23 all ranks
Interpreters	*Nil.*	2

The difference in the Army Service Corps detail attached to the Divisional Staff for supply and transport duties is due to the necessity for providing for:—

(*a*) Increased allowance of personal baggage on the Service Abroad Scale.

(*b*) Carriage of tents.

(*c*) Additional transport for supplies.

(*d*) Transport for additional Army Service Corps details.

Making in all 4 wagons and 1 cart on the Service Abroad Scale, as against 2 wagons on the Home Service Scale, and an increase in *per-*

sonnel of 1 Sergeant or Staff Sergeant for transport, 1 Sergeant or Staff Sergeant for supply, 8 rank and file—drivers, &c.

The Artillery Staff is as follows :—

Regimental Staff.	Officers.	Staff-Sergeants (Clerks).	Rank and File.	Total.	Horses, private or provided under Allowance Regulations.	Remarks.
Lieut.-Colonel Comdg. 3 Field Batteries and Infantry Divisions.						
Ammunition Column	1	1	2	4	2	
Adjutant, R.A.	1	...	2	3	2	
Medical Officer	**1**	...	...	**1**	**1**	Details included in block type are included in details attached to Batteries, and not included in the Divisional Staff.
Veterinary Officer	**2**	...	...	**2**	**2**	
Total	2	1	4	7	4	
	3	...	...	**3**	**3**	

It will thus be observed that there is a radical difference between the mobilisation of the Regimental Staff of Corps Artillery and of the R.A. Staff of an Infantry Division : the former is a self-contained unit, and the Colonel Commanding is in the same position in respect to the General Officer Commanding the Army Corps, as is the commander of one of the Infantry Divisions composing it : the latter is *included* in the Staff of the Infantry Division to which it belongs, and has no existence as a separate unit.

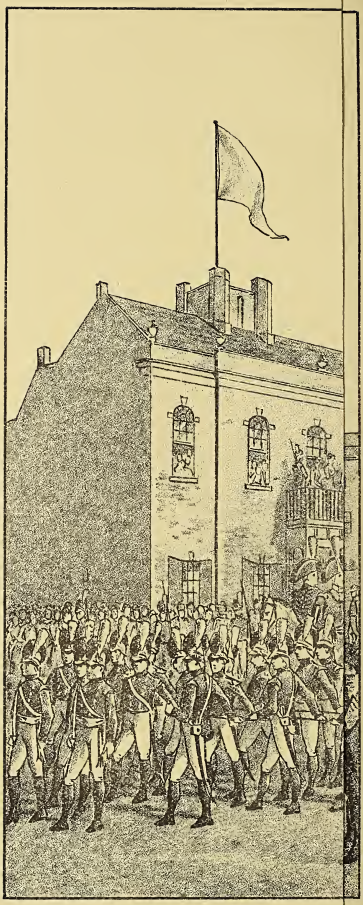
The Colonel Commanding the Corps Artillery is responsible for the mobilisation of his Staff, and for the arrangements at the concentration place for the assembly of the units under his command, subject to instructions from the Corps Commander, he acts on his own initiative throughout.

The Lieut.-Colonel Commanding the Divisional Artillery and Ammunition Column, on the other hand, has no Staff to mobilise as a separate unit ; he has merely to put himself in communication with his *personnel*, with a view to *assembly* at the place and time ordered by the Commander of the Infantry Division.

It may be mentioned incidentally that the R.A. Officers on the Head-Quarters Staff of an Army Corps are : an Officer Commanding Royal Artillery (Major-General or Brigadier-General), a Brigade-Major, R.A. and an *Aide-de-Camp*.

(To be continued).

INSPECTION OF THE HONOURABLE ARTILLERY COMPANY BY LIEUT.-GENERAL THE EARL OF HARRINGTON, AT HEAD-QUARTERS, FINSBURY, SEPT. 22ND, 1803.



THORN, WOOLWICH

INSPECTION OF THE

J. A. L.

THE ARTILLERY BRANCH

OF THE

HONOURABLE ARTILLERY COMPANY OF LONDON.

BY

CAPTAIN J. A. LABALMONDIERE, R.A.

AND

LIEUT. A. L. MORANT, H.A.C.

The ancient and interesting regiment known as the Honourable Artillery Company dates from a period before the existence of any corps forming part of our present military system.

Royal Charter, 1537.

Enrolled by Royal Charter in 1537, the members of the Guild or Fraternitie of St. George met for instruction and practice in the "science of artillery, that is to witt for Longe bowes, Crosbowes and Handgonnes." The Tessel ground, Bishopsgate, was the original artillery garden where in 1581 the gunners of H.M. Navy were trained under the Master-Gunner of the Tower, an officer with whom the Company remained at feud for many years. Circumstances compelled the Company to change its ground, and in 1641 the present Artillery ground in Moorfields was acquired, containing about six acres, on which a hundred years later, in 1735, the Armoury house was built. From the earliest times the Company has been mainly formed of infantry, and since the review of the corps by George I., in 1722, the uniform has been scarlet.

The name "Artillery Company" has often caused misconception as to its composition, but it must be remembered that in the 16th Century the term "Artillery" was applied to any bolt or missile discharged from any weapon, and that infantry is the natural development of archers, arquebusiers and of the pikemen who were always associated with them.

Artillery Armament.

It was not until the commencement of the 18th Century that the Company possessed artillery pieces of its own and then they were "battalion guns" after the custom which prevailed to a later date in the regular army. Among the warlike stores of the Company in 1738 we find record of three field pieces and one mortar piece, and some years later (1745) during the ferment caused by the rebellion of the young Pretender, twenty-one pieces of cannon, one mortar, and sixteen cohorns belonging to the Corps were sent to the Tower for safe custody. Previous to this time if guns were required for the "exercises" they

were borrowed from the Master of the Ordnance, as in 1671 a train of artillery was hired for a march through the City, and in 1674 the Court of Assistants ordered a "train of artillery consisting of six field pieces and two wagons" to attend a field parade. Again six field pieces were lent by the Tower authorities in 1682, for the days of exercise.

Formation of Artillery Branch, 1781

No doubt there were in the Company skilled and competent men to work the ordnance thus borrowed, and a very natural desire seems to have existed among them to be formed into a distinct branch of the Regiment; accordingly on the 22nd November, 1781, over sixty years after the organisation of the Royal Artillery, the "gentlemen practising the field pieces" petitioned the Court of Assistants to be allowed to form a division of their own, to be termed the Matross Division.

They were told off into two companies, one for each gun, and each under a Captain and a Sergeant; and they received instruction from the Master-Gunner of the Tower who was employed by the Company in 1794 giving twelve drills a year.

The armament in the matter of field pieces is not easy to trace. In 1779, the Company applied to His Majesty for two brass field pieces, and they were ordered to be cast by Messrs. Kinsman & Co.

Gordon Riots.

In 1780, the Honourable Artillery Company, assisted by the gentlemen of the London Foot Association, rendered signal service in suppressing the dangerous riots known as the Lord George Gordon Riots, which in six days brought death or serious injury to 458 persons in London. For these services the Court of Common Council presented the Honourable Artillery Company with the above-mentioned brass field pieces. These were 3-pounders and are still in the Company's possession.

In 1803 the armament was increased by two 6-pounders which were presented by Sir William Curtis, President of the Company, and the old brass 3-pounders were recast. The Matross Division was increased correspondingly, and no important addition or change took place after that until 1860.

Reverting to the records of the end of last century we find that on July 21st, 1781, the Honourable Artillery Company had a field-day between Sydenham and Dulwich in which a battery of nine light pieces of cannon and three cohorns took part. These were probably lent to the Company. In 1799 the Honourable Artillery Company paraded 421 strong at the great review held by King George III. in Hyde Park, when the guns of the Matross Division which had been brought on to the ground by hand, fired a Royal salute of 21 guns.

Horse Artillery Troop.

In 1860 a Horse Artillery Troop was formed at the instigation of Captain-General H.R.H. The Prince Consort, who took a deep interest in its progress, and in June of that year a uniform for the troop was sanctioned which was of Royal Horse Artillery pattern but with silver lace. After a short but successful career of nine years under the leadership of Captain Jay, it was disbanded by order of the Court of Assistants of the Company, on the ground of the great expense of its maintenance.

At first the troop had been to a great extent horsed and kept up by Captain Jay, but latterly the expenses were equally divided between

THOS. WOOLWICH

UNIFORM OF THE MATROSS (ARTILLERY) DIVISION,
1797—1822.

the troop and the regimental funds, and this was found to be too great a burden.

The *Illustrated London News* of 1863, in its article on the Brighton Manœuvres of that year, gives some idea of its turn out. "Each gun "was drawn by four horses which were specially kept for the purpose. "When marching past they advanced at a gentle canter, gradually "increasing their pace until a racing gallop was reached, causing "dismay to those spectators who were aware what skill is needed in "maintaining such a speed." The two guns for this troop were 6-prs. and were supplied from Woolwich.

Composition of Company, 1862.

In 1862 the Company numbered 844 members and comprised besides the Horse Artillery troop, a troop of Light Cavalry, a battery of Field Artillery (the old Matross Division with four guns), and a battalion of ten companies.

The 6-pounders of the Field Artillery were first horsed in 1860, being drawn by four horses each; two more guns—6-pounders—were added in 1864, and on the disbandment of the Horse Artillery troop, its two guns were returned to Woolwich and two 4-inch howitzers were drawn instead, so that in 1867 the Field Battery was a six-gun battery equipped as the Royal Artillery batteries were at the time, with four guns and two howitzers.

In 1880 the Company went into camp at Southend, the Field Battery taking four 6-pounders and one wagon by route-march, each drawn by four horses.

New Armament.

The guns, carriages, etc. were by this time very old, and the Commandant at Shoeburyness who inspected the Regiment condemned the armament as dangerous and unfit for service. The Duke of Portland, then Lieut.-Colonel Commanding, applied for and obtained (1881) four new guns—9-pounders R.M.L., of 6 cwt.—as a loan from the War Department. New harness and saddlery was similarly obtained in December, 1886.

Instruction in Artillery.

No proper record seems to have been kept of the earlier attempts to carry out gun-practice. The first mention of this is in 1822 when the Matross Division went twice a year to Woolwich to fire their guns. The instruction of the batteries was mainly dependent on the officers of the Regiment, but in 1840 Drill-Sergeants from the Royal Artillery were employed to instruct. This help was probably continued more or less regularly, and from 1870 until 1889 the Sergeant-Instructor of the Field Battery was Sergeant-Major Cochrane, R.A., a man well-known to generations of Artillery Officers as the Sergeant-Major at the R.M. Academy.

Adjutancy.

Prior to 1889 the Adjutant of the Company had never been an Artillery Officer. The last three Adjutants before that date were Captain Potts, Colonel Morrison, and Major Borton, the two latter having previously served in Royal Marines and the Infantry of the Line respectively. They were all three appointed by the Crown, but only the two earlier Adjutants were paid by the Government. Major and Lieut.-Colonel Borton's salary was paid by the Company and his tenure of the post lasted from 1875 to 1888.

Constitution of the Honourable Artillery Company.

Before commencing the period following the reorganisation of the Regiment in 1889, when the Company took a new lease of life, and began to re-assert its position as the premier Volunteer Corps of England, it would be well to give a short explanation of the ancient constitution of the Company. Previous to the year 1889 the supreme head of the Corps was the Crown, to whom the members looked for their privileges and chief command. The Sovereign has almost invariably occupied the position of Captain-General, the first to hold the Command being H.R.H. James Duke of York, afterwards James II.; the present occupant of the rank being H.R.H. the Prince of Wales, who succeeded his father in 1862. The Prince was proposed and seconded for election in the ordinary way, viz.:

"To the Court of Assistants of the Hon.
Artillery Company.

Gentlemen—We beg to recommend H.R.H. Albert Edward, Prince of Wales, K.G., K.S.I., D.C.L., &c., &c., of twenty-one years of age, and of the height of 5 feet 6 inches, to be admitted a member of the Hon. Artillery Company."

(Signed by the Lieut.-Col., two Majors and 18 Members.)

His Royal Highness resigned in 1889, and was re-appointed on 14th June, 1893.

Command.

Next to the Captain-General, the command is vested in the Lieut.-Colonel Commanding all arms, who is appointed by the Sovereign. The Company is now divided into three branches: Horse Artillery, Field Battery, and a Battalion of six Companies of Infantry. The staff includes a supernumerary Lieut.-Colonel, a Major for the Artillery, and an Adjutant appointed from the Regular Forces; and the authorised establishment of the whole Company is at present 899 members, exclusive of the Veteran Company.

Varying Strength.

The Corps has varied very considerably in strength, recruiting having been spasmodic to a degree. In 1803 when Britain declared war against France, and Bonaparte assembled 100,000 men at Boulogne to invade England, recruits presented themselves in large numbers, no less than 639 men being enrolled in July and August of that year; thus shewing what effect a threat of invasion has upon the citizens of London. The present strength of the regiment is 465 (excluding the Veterans who number about 150) showing an increase of 60 upon the numbers on 1st November, 1892.

Reserve and Veteran Companies.

A unique feature of the Company's "establishment" is the inclusion of a Reserve Company and a Veteran Company. The former is composed of members who have been returned as efficient for two consecutive years. "They will be considered as reserve men who are willing to join the active companies should their services be required." The value of such a company must be apparent to all, as it is a means of retaining the services of men who, by reason of business or other cause, are compelled to quit the metropolis for any lengthened period. Those who are acquainted with the Volunteer movement know what a great drain upon the efficients in many Volunteer Corps is due to this transfer of young business men to a distant office or similar cause. The

Veterans are men who have been eight times efficient, and have been transferred from the active companies, either at their own wish or compulsorily for age, etc. They are deemed permanently retired, but continue to pay their subscriptions as members; they are entitled to retain the uniform of their former branch with the addition of the letter "V" on the shoulder-straps.

Civil Side.

The Company as a civil body is governed by a Court of Assistants, composed of a President (now Lord Colville of Culross, K.T.), six *ex-officio* members, and a body of 24 members elected annually from the active and veteran lists. All enrolled members of the Company who are of age have the right to vote for their 24 representatives in the Court of Assistants.

The duties of this body are to enrol recruits approved by the Commanding Officer, to administer the finances, and to grant sums of money to the Lieut.-Colonel Commanding, upon his requisition. Formerly the officers, except the Captain-General, were elected by this body until, in 1842, by Royal Warrant, the Crown reserved to itself the right to appoint the Field Officers and Adjutant; but it was not until seven years later that the Crown, by Royal Warrant, announced its intention of appointing all the officers, the Captain-General appointing the Regimental Sergeant-Major. These commissions were only granted for periods of five years; since 1889 they are "during pleasure." It is unnecessary to dilate upon the former penal powers of the Court, or upon its power to grant commissions to the officers; but the procedure of electing members is singular and noteworthy.

Procedure on Enrolment.

Each candidate is proposed and seconded, and appears on a certain day before the Court, when he is asked certain questions, *e.g.*: "Are you well affected to Her Majesty Queen Victoria, and the Constitution of this country?" Should all the questions be answered satisfactorily, he signs the Military Roll, and then this declaration:—"We the undersigned, being well affected to the Queen and Constitution, do hereby engage upon our honour, so long as we shall continue members of the Honourable Artillery Company, to accept the terms of the Royal Warrant, dated 12th March, 1889, and to conform to all regulations made by the Secretary of State for War in the pursuance thereof, and to all rules and orders made for its government, to be obedient to our officers, to be constant in attending to our military duties, and especially to appear under arms upon all occasions when the Company may be mustered for the purpose of assisting the Civil Power in maintaining tranquillity or suppressing riot." This done and his subscription of two guineas paid, he is a properly enrolled member; no oath being necessary. There is a large amount of misconception still pervading the public mind as to the financial position of the Company, the common idea being that the Regiment is wealthy, and that the suppers and entertainments given by it are paid for out of the regimental chest. This is entirely erroneous, the income derived from house property in the city being barely sufficient, with the Government grant, to meet the military expenditure.

The intervention of the War Office in 1889, with a view of re-organising the Company according to more modern principles, has been

productive of most striking results, more especially in the artillery division. The Company had been, no doubt, regarded as a valuable adjunct to the existing Volunteer Force before that date, and Sir Charles Dilke, in a striking article in the *Fortnightly Review* of 1888, referring to the absence of any mobile batteries in the Auxiliary Forces, hazards a conjecture that "that ancient and well-to-do organisation called the Honourable Artillery Company . . . . could put six field pieces in line." In this, however, he was mistaken, but in March 1889, with the Royal Warrant under which the Regiment now thrives, came a new order of things, which has resulted in the Artillery division becoming an important factor in the national defence. A Royal Artillery Officer on full pay was appointed Adjutant, and three picked Royal Artillery N.-C.O.'s were appointed as Sergeant Instructors. The guns previously held in charge having been returned to Woolwich Arsenal, six 9-pounder R.M.L. guns with new harness and saddlery were issued to the Company. A little later a special set of Regulations for the Honourable Artillery Company was issued, prefaced with the Royal Warrant of 12th March, 1889, under the provisions of which the Regiment passed under the control of the Secretary of State for War.

Military Service.

The Company is privileged to assemble "whenever an order for the embodiment of the Militia is in force, and Our said Company is called out by Our Royal Proclamation . . . . and shall remain on actual military service until released in accordance with Our Royal Proclamation," also to continue to act in aid of the Civil Power "when duly called upon."

It had been exempted by name from the operation of the Volunteer Act, 1863.

Conversion of Light Cavalry into Horse Artillery.

On 12th March, 1890, an Army Order notified the conversion of the Light Cavalry troop, which had not hitherto attained any high standard of efficiency, into a troop of Horse Artillery, the Government supplying the necessary equipment. The two batteries go into gunnery-camp at Shoeburyness, and in addition have a week's camp of exercise at some military station every year, when they are fully horsed, and elicit as a rule most favourable commendation from the authorities.

Towards the end of the year 1890, the Adjutant-General, Sir Redvers Buller, wrote that "the excellent progress reported already in the mounted branch of the Regiment, confirms His Royal Highness (Commander-in-Chief) in the opinion that a valuable Artillery Corps could be formed from the Honourable Artillery Company." The appointment of a supernumerary Lieut.-Colonel in the course of the following year, in the person of the Hon. R. Allsopp, Major (r.p.) R.A., tended to give a fresh impetus to the growing efficiency of the artillery branch, which it appeared the desire of the War Office authorities to develop.

Government Grants Obtained, 1891.

The formidable expense of maintaining two batteries of artillery in thorough working order induced the Commanding Officer, Lieut.-Col. Lord de Vesci, to apply for capitation grants and allowances for that branch of the Regiment. This being *partially* conceded by the Treasury, the Lieut.-Colonel was enabled to accept the offer of a definite place in the mobilisation scheme. The batteries will thus be able to place eight guns fully horsed and equipped, in a position to reach their

allotted post within 48 hours of the order to mobilise. Gun and wagon horses are obtained by contract with two or three large livery establishments in London, and as far as possible the same horses are procured regularly. The horses for detachments and single mounts are provided by the members themselves.

The instruction of the batteries proceeds vigorously from February until Whitsuntide under the personal superintendence of the Adjutant, who carries through a course of gunnery, drill, and fire discipline, similar to the system in force in the Royal Regiment. Mounted drills take place as a rule after Whitsuntide, on the grass drill-ground at Headquarters. During the summer the batteries constantly take part in field-days in conjunction with other arms. Each battery has four guns, two ammunition wagons, and a general service wagon, and there is also an ambulance wagon.

The guns are, as already mentioned, the 9-pounder R.M.L., of 6 cwt., and are kept in the sheds specially built for them, while harness and equipment are kept in the harness rooms and spacious armoury. Mounted men, except drivers, are armed with the cavalry sword, and the gunners of the Field Battery have Martini-Henry carbines with sword bayonets.

Uniform.

Each member provides his own uniform at a cost of about £16 in the Horse Artillery, and £13 10s. in the Field Battery. New members under the age of 21 (called cadets) need only provide undress uniform.

The outfit comprises tunic, busby, stable jacket, serge frock, overalls, pantaloons, cloak and cape, besides boots and other articles. The uniform is in many respects similar to that of the Horse and Field Batteries R.A., the lace being gold.

The resignation of Colonel Lord de Vesci, gave a step to Lieut.-Col. the Earl of Denbigh, who had succeeded Lieut.-Col. Hon. R. Allsopp as Lieut.-Colonel (supernumerary), and he took over the command in June, 1893. He was formerly Captain R.A., and is able to give much attention and assistance to the Artillery. The present Adjutant, Captain Labalmondiere, R.A., was appointed in 1889, and quite recently has had his time extended.

The officers appointed since the re-construction, have all been attached to service batteries for various periods, and have, in all cases, passed the examination at the end of the course with great credit.

Since H.R.H. the Captain-General has rejoined the Company he has exercised his right to appoint the Sergeant-Major from one of the four instructors, who deserve the greatest credit for their efforts in carrying out the training of the N.-C.O.'s and men.

The *personnel* of the Artillery division is gradually increasing in numbers, and the recruits so far are of the right stamp, smart, hard-working, and zealous for the good name of the corps.

In spite of the fallacy so widely believed in, that it is expensive to enter the Company, there is little doubt that the standard of 165 men for the Horse Artillery Battery, and 163 men for the Field Battery, will before long be reached.

Head-quarters,—Its Advantages.

The head-quarters of this ancient corps are at the Armoury House, close to Finsbury Square, within five minutes' walk of the Bank of England. It is therefore most conveniently situated for business men, who form the bulk of the regiment, and, possessing as it does all the advantages of a club, and a large drill-ground which is used for cricket and all kinds of athletics, it is small wonder that the Honourable Artillery Company should be rapidly becoming the most popular of all corps in the metropolis.

THE "OUTLINES OF QUATERNIONS."[1]

BY

LIEUT.-COLONEL H. W. L. HIME, *late* R.A.

COMMUNICATED BY

THE SECRETARY.

It is many years since Colonel Hime's first contribution, "Rough notes on the History of Field Artillery," appeared in the pages of this journal. It was a short and unpretending paper, but, slight as it was, it proved that its writer might fairly hope to reap literary laurels outside the field of mere professional journalism, and, more important still, it contained the *leit motif* of valuable work that was to follow. In these days Colonel Hime was an enthusiastic field gunner and he was not the least successful of those, to whose continued efforts is due the place of pride the Field Artillery now holds. Okehampton had not been dreamed of, but there were men, and he was one of them, who fully realised what were the proper functions of their arm. The papers on the Mobility of Field Artillery, brilliantly written, but terse withal and ever to the point, stand as a literary landmark that future regimental historians will not willingly pass by; while the essay on the Tactics of Field Artillery, the first and also the best of the series, is a model of what a prize essay should be.

All Colonel Hime's contributions have had one common characteristic; they are eminently readable. If an incident had a humorous side, it never escaped him; whether he found it in the serious quaintness of Eldred's aphorism, in the history of the unfortunate Godless gunner, or in the fate of him who defied the accuracy of the Seventeenth Century Gun, and, when vapouring on the battlements in his shirt, was slain there for his temerity.

After five years of singular success as the secretary of the R.A. Institution, Colonel Hime's contributions ceased when he put the corner stone to his work by the valuable "compilation" known as the "War Services of the Royal Artillery."

We do not know how far the periodical press has been indebted to his trenchant pen, but there are two publications that bear his name that may well be taken as proof of his versatility. The musical criticism on Wagner entitled "Wagnerism: a Protest" and the essay on Con-

[1] Longmans, Green, & Co., London and New York, 1894.

scription which was awarded the Prize Medal of the United Service Institution. Colonel Hime has always the courage of his opinions and his literary motto is "*L'audace, l'audace, tonjours l'audace.*"

In the present work he has let the light in on another facet of his many-sided intellect and appears as a disciple of Sir William Rowan Hamilton in that abstruse field of Pure Mathematics known as the "Theory of Quaternions."

He, like Colonel Hime, was a graduate of Trinity College, Dublin. Some sixty years ago his attention was drawn to the attempts that had been made by many geometers to give a geometrical interpretation to the imaginary quantity symbolized by the square root of negative unity $\sqrt{-1}$. Descartes, Newton and Euler had discussed the quantity, but merely from an algebraic stand point. H. Kühn, of Dantzic, 1750, appears to have been the first to associate the symbol with geometrical perpendicularity. He regarded $a\sqrt{-1}$ as representing a line perpendicular to a line a and equal to a in length and was followed by Argand who interpreted the complex number $a+b\sqrt{-1}$. Sir William Hamilton based himself on the conception of Kühn. The notion of a "Vector," a straight line which has both magnitude and direction, next occupied his mind and he was led, as also was Grassmann about the same time, to the theory of the geometric addition of vectors in space. The great step made by Hamilton was the passage from vector algebra to the formation of an operational calculus. A quaternion is an operator which turns any one vector into another. It operates in two ways (1), by tension, positive or negative (2), by torsion or version and is found to involve a knowledge of four numbers. From this occurrence of the number four the name "quaternion" is derived. Hamilton elaborated the theory to an extraordinary extent and showed the power of the new calculus by extensive applications both to Pure Mathematics and to Physics. His "Lectures" appeared in 1852 and his "Elements" in 1866. The great work given to the world in these two portly volumes was composed at the Dunsink Observatory when Hamilton was Royal Astronomer of Ireland. The reading of these works presents great difficulties even to professional mathematicians. Easier treatises have appeared of recent years, but none of them are on the same lines as the book before us.

Colonel Hime adopts Clifford's more general notion of a "Vector," defining it to be "any quantity which has both magnitude and direction," and from the point of view of the numerous physical applications, this is no doubt preferable.

After an exposition of the subtraction and addition of vectors in spaces of two and three dimensions, he proceeds in Part II. to explain the nature of a "quaternion." This is as clear and precise a statement of the first principles of this difficult subject as has ever appeared in print. The elementary algebra and differentiation of quaternions is succeeded by an account of scalar and linear vector equations and the volume concludes with numerous well-chosen illustrations of the power of the quaternion analysis in elementary geometry.

In the columns of "Nature" and elsewhere a controversy has been

recently raging concerning the true bases of the science of quaternions. While on the one hand some mathematicians regard the "quaternion" as claiming a necessary and fundamental place in a system of Vector Algebra, on the other hand, others hold a different view and many new definitions and notations have been suggested.

The controversial field is at the present moment literally strewn with killed and wounded, and it is upon this scene of carnage that Colonel Hime presents himself with his "Outlines." His friends may, we think, have faith that he will emerge from the conflict, if not unscathed, at any rate fully recognisable by his old comrades.

He takes his stand by Hamilton in regarding the quaternionic product as essential, and we await with interest the critical reviews of his treatment of the points at issue which will doubtless appear in due time from the pens of several of the high priests of the subject.

For ourselves we agree with Colonel Hime in regarding Hamilton as the master as well as the inventor of quaternions.

The logical sequence maintained throughout the book is excellent, and evidently the result of careful thought.

There is an excellent table of contents.

GENERAL SIR CHARLES NAPIER

ON

ARTILLERY DRAUGHT.

COMMUNICATED BY

CAPTAIN H. A. BETHELL, R.A.

Now that the question of Draught is exciting so much attention, it may be of interest to know the opinions formed upon the subject, by one of the clearest-headed men of the century.

Sir Charles Napier was not only a profound thinker, but a sound, practical man, and on the subject of Draught, his long experience of Indian campaigning entitles him to speak with authority.

The chief difference between the Bengal and Bombay Artillery is in their mode of driving, which they denominate single and double driving. Single driving is one rider to a pair of horses; its chief advantages are:—1st, the guiding is directed by one will, at least, said so by the Bombay officers. This may be true on an English road with well-trained horses; it may be doubted with the wild driving of a campaign, half-trained horses, and no roads. 2nd, the off wheel-horse has less severity of work, having no rider to carry; but the draught will not be equal. These, and other objections do not, however, seem to be well ascertained; for the horse which suffers from carrying the man can be relieved by changing him to the off side; and though this also is disputed by the opponents of single driving, it is certain the man who rides one horse and drives the other must be well-trained and experienced for a country full of bogs, nullahs, and broken ground.

Double driving, used in Bengal, is having a second rider on the off draught-horse. The advantages are:—1st, the wheel horses have an equality of labour. 2nd, the second rider helps to work the gun. 3rd, there is more simultaneous movement, each rider imparting his will easily to the horse he bestrides; and emergencies dictate a simultaneous impulse to both riders; the sight, the voice and the hearing act together. 4th, if an obstacle impedes a gun, and each horse is led by a man on foot, they may be unable to get the gun over; but let those men mount the four horses, and the increased weight and simultaneous effort instantly succeeds. An instance of this occurred under my command, in the Booghtee Hills. 5th, if one man is struck by a shot another remains to conduct the horses. 6th, a driver, bringing a gun into heavy fire, obtains moral support by having a comrade, and they drive daringly.

On these advantages and disadvantages the ablest and most experienced Artillery Officers differ.

Poles and shafts offer a more practical question, yet are disputed with so much tenacity that it would be hazardous to give an opinion.

MEMOIRS
HISTORICAL AND BIOGRAPHICAL.

THE BROME-WALTON FAMILY.

BY

MAJOR AND QUARTERMASTER R. H. MURDOCH, R.A.

(Assistant-Superintendent of Records).

Chapter V.—*Continued.*

In describing the relative positions of the Allies at the battle of *Minden*, in the "Proceedings" of May last, the six British regiments were correctly *aligned*, but their *order* got inverted in the act of transcribing from original MSS. to fair copy for print.

Both *alignment* and *order* are, however, accurately delineated in the plan of the battle.

These famous infantry regiments may naturally be sensitive as to their correct positions in the memorable battle, and I therefore hasten to make this acknowledgment.

Page 248:—

6 batt. guns.	(L.)	23rd Regt. (Welsh)	37th Regiment.	12th Regiment.	(R.)	6 batt. guns.
		25th ,,	51st ,,	20th ,,		
		Saxe-Gotha Regiment.		Hanoverian Guards.		

Page 250:—

		11	10	9		
Killed and wounded.	(L.)	Welsh Fusiliers. 9 officers, 197 men.	37th Regiment. 15+231.	12th Regiment. 17+262.	(R.)	Total 76+1210.
		45 25th Regiment. 7+138.	**44** 51st Regiment. 10+98.	**43** 20th Regiment. 18+314.		

The figures in *block* type will now serve to identify the regiments by the corresponding numbers on the plan of the battle.—*R.H.M.*

LIBRARY,
JUL 23 1894
U. S. PATENT OFFICE.

ABSTRACT OF THE PROCEEDINGS

OF THE

FIFTY-SEVENTH ANNUAL GENERAL MEETING

OF THE

ROYAL ARTILLERY INSTITUTION.

THE Annual General Meeting was held on the 15th June, 1894, at the Lecture Theatre, Royal United Service Institution, Whitehall.

General Lord Roberts, V.C., took the Chair at 3 p.m.

Among a large number of Members present were Lieut.-Generals Sir W. Stirling, K.C.B., R. J. Hay, K.C.B., E. F. Chapman, C.B., W. H. Goodenough, C.B.; Major-General H. Le G. Geary, C.B.; Colonels C. C. Trench, W. S. Curzon, G. J. Burgmann, A. E. Turner, C.B., and R. D. Eliott Lockhart.

The Chairman invited the Secretary to read the Annual Report as follows:—

Annual Report.

The number of Members joining during the twelve months under consideration has been nearly the same as during the previous year; the fact of young Officers not being commissioned for many months after leaving the Academy must always seriously affect the numbers who join.

The increase in the Library continues; during the year the Institution has joined the Hakluyt and Navy Records Society, and reference to the Appendix (E) will show that all standard Military works have been bought as they appear.

Lectures.

The number of Lectures has been greater by one than in the previous year. On two occasions the Committee have been 'At Home,' at 4 p.m., previous to the delivery of a Lecture by an Officer in the Regiment. On each occasion a very large number of people availed themselves of the Committee's invitation, and so successful were these 'At Homes,' that the Committee hope to repeat them next season. The Lecturers on the days of the 'At Homes' were Major W. H. Williams, R.A., on "His Travels in Uganda and East Africa;" and Major H. C. L. Holden, R.A., on "His Visit to Chicago."

The other Lecturers were Major A. J. Hughes, on "Okehampton, 1893;" Dr. T. M. Maguire, LL.D., on "Chanzy's Campaign;" Bde.-Surgeon Lt.-Col. Evatt, M.D., A.M.S., on "The Sanitary Care of the Soldier;" Veterinary Lt.-Col. Walters, A.V.D., one Lecture on "Stable Management," and another on "Saddlery and Sore Backs." Capt. C. Orde-Browne also gave a description of the "Directions for the Attack of Armoured Ships by Shore Batteries;" this Lecture was open to Officers of the Army and Navy only, and will not be published.

The Committee are anxious that Members should suggest the name of any Lecturer, or subject for a Lecture, likely to be of general interest.

Collection of Pictures.

The Pictures by Officers R.A. are now all hung in the Drawing Room, and form a very interesting collection; if the present rate of additions to the gallery should continue, the Committee will soon have to seek for more room. The thanks of the Regiment are due to those talented Officers who have so generously given specimens of their best work.

Notice of Advertisements.

During the past year the Committee instituted a system of sending out monthly with the "Proceedings," a sheet, containing Advertisements of Articles, or Property for Sale, Houses to Let, and wants generally, of Members. Possibly Members have overlooked the notice drawing attention to the system, as but little use has been made of it.

Gifts.

Gifts to the Institution continue to be received from all quarters; amongst others, Mr. H. G. Slade has given several M.S. Note Books and Letters, Sketches, Surveys, Pay Books, and Military Works, the property of his late father, Captain Henry Slade R.A., who served through the Peninsular and American Campaigns; Count Ostrorog, late Lieut. R.A., has given a life-size portrait of General Lord Roberts, V.C., &c., &c. Major A. D. Seton, Forfar and Kincardine Artillery Militia, has given an engraving of "The Wreck of the Birkenhead," as a mark of gratitude for the kindness he has received from the Institution; Lieut. G. G. Traherne, R.A., has given a very fine Koran, from the Miranzai Country; and Major-General F. W. Stubbs, late R.A., several records of the Bengal Artillery.

Last year the Institution received a legacy in the shape of a trophy of arms and weapons left by Miss Mary Augusta Gordon, "as a small token of her gratitude for the kind sympathy of the Officers Royal Artillery towards her late brother, General C. G. Gordon, C.B., R.E."

The sale of the "Proceedings" to the public, through Messrs. Dulau & Co., has again increased most satisfactorily.

Honorary Members.

The Committee have availed themselves of the powers given by the new clause in Rule II., and have elected the following gentlemen connected with naval or military arts and sciences Honorary Members, viz.:

W. Kellner, Esq., Ph. D., Chemist, Royal Arsenal.
Prof. C. V. Boys, F.R.S.
Prof. W. D. Niven, M.A., F.R.S.
Poultney Bigelow, Esq.

There were on 31st March, 1894—1822 Members of the Institution, as against 1791 last year. 76 Officers joined during the year, as against 88 last year. The number of deaths was 21, and withdrawals, 21.

Among the deaths are to be noted the names of the following Officers :—

Gen. Sir E. B. Johnson, G.C.B., C.I.E., Col. Commdt.; Gen. Sir E. B. Hamley, K.C.B., K.C.M.G., Col. Commdt.; Gen. Sir George Balfour, K.C.B., Col. Commdt.; Major-Gen. Sir C. C. Teesdale, V.C., C.B., K.C.M.G.; General Sir F. A. Campbell, K.C.B., Col. Commdt.; Lt.-Gen. J. R. Gibbon, C.B.; Major-Gen. C. H. Ingilby, C.B.; Col. F. C. H. Clarke, C.M.G.; Lt.-Col. R. W. Kaye; Lt.-Col. W. Whateley; Lt.-Col. B. F. Domvile; Lt.-Col. W. P. Georges; Capt. W. F. King; Captain J. R. K. L. Heyland; Captain C. H. A. Hervey, and Captain C. F. Lendy.

Accounts—

Appendix A shows the previous year's charges before each item as suggested at last year's Annual General Meeting by Lt.-Gen. R. J. Hay, C.B.

The General Credit is £4,096, as against £3,804 last year.

"Duncan" Gold Medal, 1894.

In accordance with the change notified last year, the essays submitted for the Duncan Gold Medal, 1894, were type-written in triplicate. The Subject was "What is the Best Tactical Organisation and System of Training Massed Batteries of Horse and Field Artillery?"

Major-Gen. J. Alleyne, C.B., Col. R. Eliott Lockhart, and Lt.-Col. J. C. Dalton kindly consented to act as Judges.

Ten Essays were submitted for competition, and the Judges recommend that the writer of the essay bearing the motto "Union is strength," be awarded the Gold Medal; that the writer of the essay bearing the motto "Rapidité Promptitude, Audace," be awarded the Silver Medal; that the writer of the essay bearing the motto "Mens Agitat Molem," be commended.

The Secretary opened the sealed envelopes and announced that Major J. L. Keir, R.A., is the winner of the Gold Medal; Major A. M. Murray, R.A., is the winner of the Silver Medal, and that Major E. S. May, R.A., is commended.

Rewards for Papers.

Rewards for Papers—Col. A. E. Turner, C.B., Lt.-Col. E. T. Browell and Capt. C. E. Callwell, R.A., kindly consented to act as Judges.

One contributor, recommended last year for a reward of £5, asked to be allowed to decline to receive it, and requested that the amount might be added to the Rewards of this year; this has been done, and the sum of £55 is awarded in proportions as below for the papers as follows—

"Memoirs of the Brome-Walton Family"	By Major Murdoch, R.A.	£7
"A Visit to Aspern and Wagram" ...	„ Major E. S. May, R.A.	£6
"A method of evaluating corrections in the case of quick Targets," and "The value of a high site for Coast Artillery"	„ Lt.-Colonel J. R. J. Jocelyn, R.A. ...	£5
"Adjuncts of Defence"	„ Maj. Sir G. Clarke, R.E.	£5
"The French Soudan up-to-date" ...	„ Captain S. P. Oliver, *late* R.A.	£5
"A method of concentrating the Fire of a group of guns laid for direction by graduated arcs"	„ Maj. A. C. Hansard, R.A....	£5

"Practical hints on the selection and training of Australian remount horses in India"	By Major J. Hotham, R.H.A.	£2
"Notes on Optical Instruments" ...	„ Capt. D. G. Prinsep, R.A.	£2
"Okehampton Experiences, 1893" ...	„ Major A. J. Hughes, R.A.	£2
"Notes on the correction of Artillery Fire"	„ Major P. A. MacMahon, R.A.	£2
"Defence of Estuaries, Harbours, &c., against Torpedo Boat attack" ...	„ Captain J. C. Wray, R.A....	£2
"Self-adjusting Lanyard for Field Artillery"	„ Lieut. C. B. Simonds, R.H.A.	£2
"Some notes on Naval Gun Drill and Practice"	„ Captain P. E. Gray, R.A.	£2
"Clipping of Troop Horses"	„ Major G. R. Challenor, R.A.	£2
"Volunteer Adjutancies"	„ Lieut. F. E. Freeth, R.A.	£2
"Army Schools"...	„ Major A. M. Murray, R.A.	£2
"A proposed method of firing at moving objects at moderate ranges" ...	„ Captain J. U. Coates, R.A.	£2

The Committee must express their high appreciation of many contributions to the "Proceedings" during the above stated period, which are not included in the list for awards, and their regret that the amount to be apportioned does not permit of their making further recommendations.

COMMITTEE.

Changes during the past year.

Col. G. J. Burgmann	Vice	Col. J. B. Richardson
Col. R. D. E. Lockhart	„	Col. W. S. Curzon
Major C. F. Hadden	„	Col. H. de S. Isaacson
Major A. C. Hansard	„	Lt.-Col. A. W. Anstruther
Lt.-Col. E. T. Browell	„	Major W. F. Cleeve
Capt. G. R. Darley	„	Major T. H. E. Acton
Lieut. A. S. Buckle	„	Lieut. A. H. Lee

It is now constituted as follows:

PATRON AND PRESIDENT.

Field Marshal H.R.H. The DUKE OF CAMBRIDGE, K.G.

VICE-PRESIDENTS.

The Director of Artillery.
The Deputy-Adjutant-General, R.A.
The General Officer Commanding Woolwich District.

MEMBERS.

The Assistant-Adjutant-General, R.A.
The Director, Artillery College.
The Assistant-Adjutant-General, Woolwich.
The Secretary, Ordnance Committee.

Col. R. D. E. Lockhart	Major H. C. Sclater
„ G. J. Burgmann	„ E. S. May
„ C. H. Spragge	Capt. J. M. Grierson
Lt.-Col. J. C. Dalton	„ H. J. DuCane
„ E. M. Baker	„ A. Crawford
„ E. T. Browell	„ G. R. Darley
Major C. F. Hadden	Lieut. A. S. Buckle
„ A. C. Hansard	

Bankers.

Messrs. Cox & Co., and London & County Bank.

Solicitor.

E. W. Sampson, Esq., Woolwich.

TRUSTEES.

General Sir C. Dickson, Q.C., G.C.B.
„ Sir H. A. Smyth, K.C.M.G.
Lieut.-General R. P. Radcliffe.

Secretary—Major A. J. Abdy.

Change of Rule

The Report as above having been adopted, the following propositions were brought before the meeting and carried :—

Par. 3 of Rule II. on page 2 to read :—

"The Committee shall have power to elect as Honorary Members such Gentlemen connected with military or naval arts and sciences as they from time to time think fit ; and for short periods, Officers of the army and navy who may be temporarily in the garrison or neighbourhood," instead of as it now stands.

Election of Special Hon'ary Member.

The meeting then elected as a Special Honorary Member :

Field-Marshal Sir J. L. A. Simmons,

G.C.B., G.C.M.G., Hon. M.Inst. C.E., R.E.,

"Duncan" Prize Essay, 1895.

Two subjects were then chosen for submission to H.R.H. the Commander-in-Chief, the one selected by him will be announced as that for the Duncan Gold Medal Prize Essay, 1895.

THE CHAIRMAN having asked if anyone wished to make any remarks on the Report, or on the Institution generally, and receiving no reply, spoke a few words on the loss the Regiment has sustained by the deaths of Sir E. B. Hamley, Sir G. Balfour, Sir C. Teesdale, Sir F. Campbell ; and speaking of Sir E. B. Johnson, said : "he is one that I can speak about as having been a friend of my own for nearly forty years —a man of great ability, a most delightful companion, and an Officer who, in his younger days, did a good deal for the Mounted Bengal Artillery. He was Assistant-Adjutant-General when he first moved up to Meerut, and Assistant-Adjutant-General during the Siege of Delhi, and was of the greatest use to Sir Archdale Wilson ; he was afterwards Adjutant-General of the Army in India, which, at that time, was a post seldom held by an Officer of his standing—he was then not twenty years' service—and only gave it up on the amalgamation of the British and Indian Service, on which one Adjutant-General was appointed. After that he was Quarter-Master-General in India, and Adjutant-General in

India, and then Military Member of the Council in India. Meanwhile, he had been a Member of the Council of the India Office, so that his career was a very distinguished one indeed. Unfortunately his health failed him during the last ten years of his life, and his friends and others saw very little of him, which was a great grief to us all. I did see him when I came home, he was quite sensible, but he could not move—he was powerless—and he died last July. He is a great loss to the Regiment. Captain Heyland I knew very well as a most promising officer."

A vote of thanks to the Council of the Royal United Service Institution for the loan of the Lecture Theatre having been passed, the meeting concluded with a vote of thanks to Lord Roberts for taking the chair.

RY INSTITUTION,

894.

Income.

	£ s. d.	£ s. d.
to Printing	113 13 11	
Books, &c.	261 19 2	
Postage and Parcels	26 11 6	
Carpentry	4 19 3	
		407 3 10
Entrance Fees—		
Received £76 0 0		
Outstanding ... ... Nil		
	76 0 0	
Subscriptions—		
Received £1409 17 0		
Outstanding 37 14 6		
	1447 11 6	
		1523 11 6
ır on £3240 13s. 11d. 2¾ per cent. Consols less Income Tax		86 12 6
)eposit Account to 31st March, 1894		11 0 9
		£2028 8 7

Assets.

	£ s. d.	Cr. £ s. d.
and at Bankers, including £800 on Deposit		
rest		927 18 0
s, Amount owing by Members on Current Accounts, included in Income	140 4 5	
Amount owing by Members for Subscriptions, included in Income	63 10 0	
		203 14 5
d, Printing Paper	19 12 1	
Books for Sale	32 4 8	
		51 16 9
:—£3240 13s. 11d. Consols at		3192 8 2
		£4375 17 4

audited by the Committee, and with the Books of the Institution, and Book, and have found them in order. We have verified the Investment rely.

AGAR, BATES & Co., Chartered Accountants.

APPENDIX A.

GENERAL ABSTRACT
OF THE
ACCOUNTS OF THE ROYAL ARTILLERY INSTITUTION,
From 1st April, 1893, to 31st March, 1894.

EXPENDITURE AND INCOME.

1892-93. £	Expenditure.	£ s. d.	£ s. d.
123	Printing, etc.: Wages—Compositors, &c.	127 10 1	
135	Printing Accounts	67 10 2	
117	Folding, Stitching, &c.	114 12 0	
237	Printing Materials	217 13 7	
136	Wood Engraving and Lithography	165 12 11	
750			692 18 9
34	Classes		40 1 8
27	Lectures		11 19 6
500	Library and Books for Sale		452 0 4
27	Museum		41 16 6
10	Observatory		11 12 11
23	Carpentry and Repairs: Wages	23 9 6	
30	Carpentry and Repairs: Materials	46 10 10	
54			70 0 4
14	Stationery		10 7 9
77	Postage and Parcels		74 16 0
137	Clerks and Orderlies: Wages	138 16 3	
15	Clerks and Orderlies: Clothing	13 0 0	
153			151 16 3
2	Subscriptions to Societies		5 5 0
39	Fire Insurance		31 18 6
27	Washing and Cleaning		26 9 6
13	Subscriptions refunded		9 18 0
4	Collecting Woolwich Bills and Xmas Boxes		4 7 6
103	Medals, Honoraria and Rewards		78 6 0
3	Arrears of Subscriptions written off		17 8 0
	Grant for Repair of Crimean Graves		5 0 0
1843			1736 2 6
226	Balance—Being Surplus of Income for the year ending 31st March, 1894		292 6 1
2069			£2028 8 7

1892-93. £	Income.	£ s. d.	£ s. d.
96	Amounts charged to Members for: Printing	113 13 11	
293	Amounts charged to Members for: Books, &c.	261 19 2	
31	Amounts charged to Members for: Postage and Parcels	26 11 6	
8	Amounts charged to Members for: Carpentry	4 19 3	
429			407 3 10
88	Entrance Fees and Subscriptions for 1893-94: Entrance Fees—Received	£76 0 0	
2	Entrance Fees and Subscriptions for 1893-94: Entrance Fees—Outstanding	Nil	
		76 0 0	
1402	Subscriptions—Received	£1409 17 0	
59	Subscriptions—Outstanding	37 14 6	
		1447 11 6	
1551			1523 11 6
86	Dividends for a year on £3240 13s. 11d. 2¾ per cent. Consols less Income Tax		86 12 6
1	Interest on Bank Deposit Account to 31st March, 1894		11 0 9
2069			£2028 8 7

APPENDIX B.

BALANCE SHEET—31ST MARCH, 1894.

1893 £	Dr. Liabilities, &c.	£ s. d.	£ s. d.
197	To Sundry Creditors, viz.: Accounts for Goods, Printing, &c., owing by the Institution, and included in Expenditure for the year 1893-94	238 16 4	
9	To Sundry Creditors, viz.: Amount to Credit of Members on Current Accounts	8 13 2	
	To Sundry Creditors, viz.: Amount received for Rotunda Museum Repairs	15 0 0	
207			262 9 6
14	To Members' Subscriptions paid in advance		16 12 6
221			279 2 0
	To Balance, being Surplus of Assets in this Balance Sheet at 31st March, 1894, viz.:		
3577	Surplus at 31st March, 1893	3804 9 3	
226	*Add.*—Surplus of Income for the Year ending 31st March, 1894, as per Expenditure and Income Account	292 6 1	
3804			4096 15 4
	N.B.—This Surplus is in addition to the value of the contents of the Museum and Library, Instruments, Furniture, Fixtures, &c., belonging to the Institution, which the Committee have estimated at £11,000, and which are insured for that sum in the Sun Fire Office		
4025			£4375 17 4

1893. £	Assets.	£ s. d.	Cr. £ s. d.
486	By Cash in hand, and at Bankers, including £800 on Deposit Account at Interest		927 18 0
129	By Sundry Debtors, viz.: Amount owing by Members on Current Accounts, included in Income	140 4 5	
93	By Sundry Debtors, viz.: Amount owing by Members for Subscriptions, included in Income	63 10 0	
223			203 14 5
63	By Stocks on hand, viz.: Printing Paper	19 12 1	
59	By Stocks on hand, viz.: Books for Sale	32 4 8	
122			51 16 9
3192	By Investment, viz.:—£3240 13s. 11d. Consols at		3192 8 2
4025			£4375 17 4

AUDITORS' CERTIFICATE.

We have compared the foregoing Balance Sheet, and Expenditure and Income Account, with the Monthly Cash Accounts, audited by the Committee, and with the Books of the Institution, and Certify the same to be correct. We have tested portions of the Cash and Ledger Accounts, with the Vouchers and Daily Cash Book, and have found them in order. We have verified the Investment in Consols, and the Bank Deposit, with the Certificates received from the Bank of England, and from Messrs. Cox & Co. respectively.

London, *2nd May*, 1894.

AGAR, BATES & Co., Chartered Accountants.

APPENDIX C.

Statement shewing Increase and Decrease of Members of the Institution during the year ending 31st March, 1894.

Ranks.	1st April, 1893.	Increase.			Total Increase.	Decrease.				Total Decrease.	Balance		31st March, 1894.
		Promotion.	Retirement.	New Members.		Promotion.	Retirement.	Withdrawals.	Deaths.		Decrease.	Increase.	
EFFECTIVE LIST.													
General and Field Officers	459	25	—	2	27	—	21	6	4	31	4	—	455
Captains	437	36	—	3	39	25	—	2	4	31	—	8	445
Lieutenants ...	577	—	—	71	71	36	3	2	4	45	—	26	603
Medical Officers ...	2	—	—	—	—	—	1	—	—	1	1	—	1
Veterinary Surgeon	1	—	—	—	—	—	—	—	—	—	—	—	1
Quarter-Master ...	1	—	—	—	—	—	—	—	—	—	—	—	1
RETIRED LIST.													
General and Field Officers	180	—	21	—	21	—	—	10	9	19	—	2	182
Captains	77	—	—	—	—	—	—	1	—	1	1	—	76
Lieutenants ...	17	—	3	—	3	—	—	1	—	1	—	2	19
Paymasters ...	2	—	—	—	—	—	—	—	—	—	—	—	2
Riding Master ...	1	—	—	—	—	—	—	—	—	—	—	—	1
Medical Officers ...	2	—	1	—	1	—	—	—	1	1	—	—	2
Chaplain	1	—	—	—	—	—	—	—	—	—	—	—	1
Honorary Members	34	—	—	—	—	—	—	1	—	1	1	—	33
Totals... ...	1791	61	25	76	162	61	25	23	22	131	7	31	1822

APPENDIX D.

Presentations to the Library.

Extracts from Annual Report of the President, Ordnance Committee, 1892. 6 copies	The Secretary of State for War.
Drill Regulations of the German Field Artillery, 1892. Translated by Captain W. A. Macbean, R.A.	
Text Book of Fortification and Military Engineering. Parts I. & II. 2 copies	
Lithographs (Colored) R.G.F., Nos. 149 and 150	
Lithographs (Colored) R.C.D., Nos. 202, 203, 204, 205, 207, 209, and 210	

Annual Report of the School of Gunnery on Garrison Artillery Practice at Home, 1892	Deputy-Adjutant-General, R.A.
Pay Warrant, 1893	
Manual of Instruction in Signalling, 1893	
Infantry Drill, 1893	
Fifth Report on Army Schools, by the Director-General of Military Education, 1893	
Derricks, Sheers, and Holdfasts, 1893 ...	
Equipment Regulations, 1893, Part III., War, Section IIIA., Royal Artillery (Horse and Field Artillery)	
The Annual Statistical and General Report of the Army Veterinary Department, 1893	
Regulations for the Disposition and Packing of Mobilization Stores, 1893	
Regimental Debts Acts, 1893. Arrangement of Sections	
Instructions for Practice of Horse, Field, Heavy, and Mountain Batteries in India, 1893	
Regulations for "Prizes for Skill at Arms" in India, 1893–94	
Instructions for Siege Artillery Practice, 1893–94	
Regulations for Army Service Corps Duties, 1893	
Volunteer Regulations, 1893	
Field Artillery Drill, 1893	
The Army Book for the British Empire, by Lieut.-General W. H. Goodenough, C.B., and Lieut.-Colonel J. C. Dalton, R.A.	
Rules of Procedure, 1893	
Standing Orders of the Royal Artillery, 1893	
Annual Report on the Instruction carried on at the School of Musketry, Hythe, 1892	
Instructions for Siege Artillery Practice, 1894	
Arrangements for the Supply of Ammunition, Targets, and other Stores, for the Practice of Royal Horse and Field Artillery in Ireland, 1894 ...	
Treatise on Service Ordnance, 1893 ...	
Priced Vocabulary of Stores, 1893, Land Service. Part I.	
Army Act, amended to the end of the year 1893	
Annual Report of the School of Gunnery, 1893, Part I., Coast; Part II., Siege ...	

Arrangements for the Supply of Ammunition, Targets, and other Stores for the Practice of Royal Horse and Field Artillery in Great Britain, 1894 Annual Report of the School of Gunnery, Horse and Field Artillery at Home, 1893 ... ... Approved Arrangements for Siege Practice at Lydd, 1894 ... ... Approved Arrangements for Coast Defence Instruction and Practice at the Western Forts, Isle of Wight, 1894 ...	Deputy-Adjutant-General, R.A.
Map of the Anglo-Portuguese Boundary in East Africa, 6 sheets. No. 953 ... Map shewing Routes of Captain Lugard in Uganda and Unyora. No. 962 ... Map of Aldershot Division, Autumn Manœuvres, 1893. No. 971 ... ... Training of Artillery and Engineer Cadets in Austria, France, Germany, and Italy, August, 1893 ... ... Map of part of Sierra Leone, shewing Routes from Port Lokko to Interior. No. 1016 (two) ... ... Plan of Melilla and country adjoining. No. 1020 ... ... Handbook of British East Africa, including Zanzibar, Uganda, and the Territory of the British East Africa Company, 1893 ... ... Military Map of Great Britain. 3 sheets, A, B, and C. No. 979	Director of Military Intelligence.
Tables of Small Arms, Swords, Lances, &c., in use in the British Service, 1893 Photographic copy of an old engraving entitled, "The Invention of Gunpowder." From a print on "Artifices de Fue," printed at Strasburg, 1603 ...	Director of Artillery.
Reports on the Examinations held in May and November, 1893, on Officers of the Regular Forces, Militia, Yeomanry, and Volunteers ... . Report on the Examination for Admission to the Staff College. May, 1893	Director-General of Military Education.
Smithsonian Contributions to Knowledge. Nos. 842, 843 ... ... Index to the Literature of Explosives. Part II., by C. E. Munroe ... ... Smithsonian Meteorological Tables ... Smithsonian Miscellaneous Collections. Vol. 36 ... ... Eighth Annual Report of the Bureau of Ethnology, 1886-87	The Council, Smithsonian Institution.

Bibliography of the Chinookan Languages, by J. C. Pilling	The Council, Smithsonian Institution.
Ninth Annual Report of the Bureau of Ethnology, 1887-88	
Bibliography of the Salishan Languages, by J. C. Pilling	
Annual Report of the Board of Regents of the Smithsonian Institution, 1891	
Proceedings of the Institution of Civil Engineers. Vols. 112 to 115 ...	The Council, Institution of Civil Engineers.
The Landscape Miniature Rifle Range Association	
Journal of the Iron and Steel Institute. Nos. I. and II., 1893	The Council, Iron and Steel Institute.
Notes on the Construction of Ordnance. Nos. 61, 62, and 63	Chief of Ordnance. United States Ordnance Department.
Tests of Metals and other Materials, 1891 and 1892	
Annual Report of the Chief of Ordnance, U.S. Ordnance Department, 1892 ...	
Studii de Tactica Defensiva-Ofensiva, de Cav. A. de Selliers de Moranville ...	Comite des Publications Militaires, Bucharest.
Photograph of the Officers of the 1st Brigade Royal Artillery, Gibraltar ...	Lieut.-Colonel J. C. Dalton, R.A.
Water-Color Painting, "Llya Elsi, Bettwsy-Coed, N. Wales," in gold frame, by Captain T. L. Dames, late R.A. ...	Capt. T. L. Dames.
Johnston's Illustrated Histories of the Scottish Regiments; No. 2, "2nd Dragoons (Royal Scots Greys)"; No. 3, "Queen's Own Cameron Highlanders (79th Regiment)," by Lieut.-Colonel J. P. Groves, Royal Guernsey Artillery	Lieut.-Colonel J. P. Groves.
Water-Color Painting, "Interior of a Mosque at Cairo," in gold frame, by Colonel G. A. Crawford, late R.A. ...	Colonel G. A. Crawford.
Examination Papers, R.M. Academy, February and July, 1893	Governor, R.M. Academy.
Port Royal and its Harbour, with Short Notes on its History, Legends, Sports, Pastimes, and Avocations	Captain A. Capel-Cure, R.A.
Report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich, 1893	The Astronomer Royal.
Semi-Azimuths, a New Method of Navigation. Part I., by E. W. Buller, Esq., late R.A.	E. W. Buller, Esq.
Crayon Portrait of Major-General R. Oldfield, R.A., framed in oak, drawn by Lieut.-Colonel L. G. Fawkes, R.A.	Lieut.-Col. L. G. Fawkes.
Photograph of a painting by Michael Angelo Hayes, representing a subdivision of the "Chestnut Troop, R.H.A."	Lieutenant W. C. Staveley, R.H.A.

Three Photographs of Groups of Officers	Colonel H. de S. Isaacson, R.A.
Francais et Allemands, Histoire Anecdotique de la Guerre de 1870-71. 2 Vols. Militarische Dienst-Unterricht für die Kavallerie des Deutschen Reichsheeres Prince Kraft's Letters on Artillery and Infantry (in German), and Cavalry (in English), bound in one volume ... Campaign in Germany in 1866, and Atlas ... ... Exerzir Reglement für die Feld Artillerie, 1889 ... ... Exerzir Reglement für die Infanterie, 1888 ... ... Feld Dienst-Ordnung, 1887	Capt. J. M. Grierson, R.A.
Chromo Reproduction of a Picture by A. Blaikley, Esq., with a Key, entitled "Professor Faraday Lecturing to a Distinguished Audience at the Royal Society"	A. Blaikley, Esq.
Six Photographs of "Entraining Elephants at Jhansi"	Major J. H. Rosseter, R.A.
Water-Color Painting, "Castel del Ovo, Naples," in gold frame, by Major-General C. V. Cockburn, late R.A. ..	Major-Gen. C. V. Cockburn.
Six Photographs, showing the uniforms of the West African Artillery, and Views of Freetown	Major S. G. Fairtlough, R.A
Water-Color Painting, "Sebastopol in the Early Stage of the Siege, before the Russians seized the ground on the right in front of the French," in gold frame, by Major-General C. H. Owen, late R.A....	Major-General C. H. Owen.
Engraving of the Picture, by Henry, of "The Wreck of H.M.S. *Birkenhead*," in black-and-gold frame	Major A. D. Seton, Forfar and Kincardine Artillery.
Water-Color Painting "Ibex Ground above junction of Kashnai and Tyajnar Nullahs, Kashmir," by Colonel J. H. Alexander, late R.A.	Colonel J. H. Alexander.
Alphabetical Catalogues of the War Department Library, United States. From June, 1882, to 1884, and May, 1884, to June, 1891...	The Librarian, U.S. War Department Library.
Professional Papers of the Corps of Royal Engineers. Index 1837 to 1892, and Volume XIX.	Secretary, Royal Engineer Institute.
Photographic Copy of an Autograph Letter of Gerhard Johann David Scharnhorst	Poulteney Bigelow, Esq.
The International Columbian Naval Rendezvous and Review of 1893, and Naval Manœuvres of 1892	Lieut.-Commander W. S. Coles, U.S. Navy.

Water-Color Painting, "Scene on the Irrawaddy River, Burma," by Captain W. J. Honner, R.A.	Captain W. J. Honner.
Muster Rolls of Officers of the Bengal Artillery, from 1800 to 1819 ...	Major-General F. W. Stubbs.
Extracts of Proceedings of Military Boards, Bengal, 1775 to 1794, and 1781 to 1801	
Selections from General Orders relative to the Bengal Artillery, from 1787 to 1803, and 1810 to 1813	
Orders, Despatches, &c., relative to Military Operations in India, 1802 to 1812, and 1814 to 1848	
Report on the Autumn Manœuvres in Berkshire and Wiltshire, 1893 ...	Major-General J. Alleyne, C.B., R.A.
Water-Color Painting, "A Serving Man," by Major-General J. Spurway, late R.A.	Major-General J. Spurway.
Water-Color Sketch of the late Mr. Smyth, Bandmaster, R.A. Band, by Major-General J. Spurway, late R.A....	
The Address to the Literary and Scientific Society of Portsmouth, by Major-General A. W. Drayson, F.R.A.S., President, late R.A.	Major-Gen. A. W. Drayson.
Die Insel Lob-Aue, mit ihren Verschanzungen sammt jenen derr Oesterreichischen Vorposten vor der Schlacht bei Wagram im jahre 1809, in oak-and-gold frame	Major E. S. May, R.A.
Aide Memoir to the Military Sciences. 3 Vols.	
Notes on Armour, by First Lieutenant E. M. Weaver, U.S. 2nd Artillery ...	Lieutenant E. M. Weaver.
Water-Color Paintings (two), "Steeplechases, Gibraltar," and "The Bay of Gibraltar and Algeciras, with H.M. ships *Monarch*, *Sultan*, *Temeraire*, and *Iron Duke* in the foreground," by Major E. H. Thurlow, late R.A. ...	Major E. H. Thurlow.
Infantry Sword Exercise, d. 1872 ...	Major J. Pawson, R.H.A.
Two MS. Diaries from December, 1840, to April, 1841, formerly the property of the late Captain Henry Slade, R.A.	H. G. Slade, Esq.
Extracts from Garrison Orders at the Military Posts in Lake Huron between 13th October, 1814, and 12th October, 1815	
Two Note-Books containing Notes by the late Captain Henry Slade, R.A. ...	
Note-Book containing Description of Stores in Icart District, Guernsey ...	
Pay and Messing Book of No. 1 Sub-Division 8th Battalion R.A., 1838 and 1839	

Muster Roll and Pay List of a Detachment of Royal Artillery, commanded by Lieutenant Henry Slade, R.A., from 1814 to 1823	H. G. Slade, Esq.
Instructions to be observed in the Formation and Movement of a Car Brigade	
Water-Color Drawing "Cadet's Servant, Early in the Nineteenth Century" ...	
General Regulations and Orders for the Army, 1822	
The King's Regulations and Orders for the Army, 1837	
Field Exercise and Evolutions for the Army, 1824	
Instructions and Regulations for Field Battery Exercise and Movements for the Royal Regiment of Artillery, 1831	
Rolt on "Moral Command," London, 1836	
Observations on the Practice and the Forms of Courts Martial and Courts of Enquiry, d. 1839	
Instructions and Regulations for the Service and Management of Heavy Ordnance, for the Royal Regiment of Artillery, 1835	
General Regulations and Standing Orders for the Garrison of Dublin, 1824 ...	
The Manual and Platoon Exercises, 1834	
Continuation of Captain Henry Slade's Diary	
Three Water-Color Sketches, by the late Captain Henry Slade, R.A.	
Plans of Various Harbours	
Journal of the Siege of St. Philip's Castle in the Island of Minorca in 1756, by an Officer who was present at the Siege. MS.	
Lieutenant Walton's Fighting Orders on Board Bomb Ships at Expedition against Louisbourg, 1757. MS. ...	
Orders by Colonel Pattison to the Artillery Officers of the Bomb Detachments, 1761-2	
Water-Color Painting, "Nunga Purbat," in gold frame, by General Sir M. A. S. Biddulph, K.C.B.	Gen. Sir Michael Biddulph
Two Water-Color Paintings, "Chota Gugai, Kashmir," in gold frames, by Captain L. Graham, R.A.	Captain L. Graham.
The Rise and Wane of the Mahdi Religion in the Soudan, by Major F. R. Wingate, D.S.O., R.A.... ...	Major F. R. Wingate, R.A.
Rules of Orthography for Native Names of Persons and Places. Cairo, 1894 ...	

Water-Color Drawing showing the "Uniform of the Osmanli Horse Artillery," by the late Major E. G. Bredin, R.A., in gold frame	Major C. B. Piers, late R.A.
Oil Painting, "View Looking over Chinese Thibet from the Heights above Shipki, on the River Sutlej," 1874, by Lieut.-Col. E. S. B. Lockyer, R.A.	Lieut.-Col. E. S. B. Lockyer.
Instruction Spéciale pour le Transport des Troupes D'Artillerie de Campagne et de Montagne par Chemins de Fer ...	Major H. C. C. D. Simpson, R.A.
Sketches in the Crimea, by Major C. H. Owen, R.A.	P. E. Tillard, Esq.
Topographical Sketches of the Ground before Sebastopol, accompanied by an Explanatory Description, by Major M. A. S. Biddulph, R.A.	
Sixteen Photographs of Sebastopol, 1855-56	
Notes on Block and Italic Printing and Finishing Military Drawings, by Capt. A. Crawford, R.A.	Captain A. Crawford.
A Treatise on Hydrostatics, by Professor A. G. Greenhill, M.A., F.R.S. ...	Professor Greenhill.
The Outlines of Quaternions, by Lieut.-Colonel H. W. L. Hime, late R.A. ...	Lieut.-Col. H. W. L. Hime.
Original Form of Leave of Absence granted to Captain Warren, R.E. d. Cork, 5th August, 1864	Captain Berthon.
A Copy of the Koran	Lieut. G. G. Traherne, R.A.
The *St. James's Chronicle*, or the *British Evening Post*, d. 24th April, 1763 ...	Lieut.-Colonel C. F. Dixon, late R.A.

APPENDIX E.

Books, &c., Purchased.

Moltke's Militärische Werke. Part 3.
Biologia Centrali-Americana. Zoology, Parts 108 to 115; Archœology, Part 4, Text and Plates.
Index to Gould's Works on Natural History.
Royal Atlas of Modern Geography. Parts 20 to 28.
Engineer and Artillery Operations against the Defences of Charleston Harbour in 1863.
Schlachten Atlas. Parts 34 to 37.
Précis de Quelques Campagnes Contemporaines. Part 1. Par Le Commandant E. Bujac.
Experiences of a Prussian Officer during the Russo-Turkish War, 1877-78. By R. Graf von Pfeil.

Les Explosifs. Par E. Coralys.
Cinquante Problémes Tactiques Discutés et Traites sur la Carte de Rethel. Par Le Commandant Devareix.
Dictionary of National Biography. Vols. 35 to 38.
Where Three Empires Meet. By E. F. Knight.
The First Letter Book of the East India Company, 1600 to 1619. By Sir G. Birdwood and W. Foster.
Exerzir Reglement für die Feld Artillerie, 1892.
Les Methodes de Guerre, Actuelles et vers la fin du XIXth Siecle. Par Le Général Pierron.
Star Atlas, with Explanatory Text. By Dr. Hermann J. Klein; translated by E. McClure, M.A., F.L.S.
Cabool; being a Narrative of a Journey to, and Residence in that City, in the years 1836-7 & 8. By Lt-Col. Sir A. Burnes.
Narrative of the Euphrates Expedition, 1835-37. By General F. R. Chesney.
The Life of the late General F. R. Chesney, R.A., Col.-Commandant.
La Fortification Passagére en Liaison avec la Tactique. Par V. Deguise.
Lloyd's Register of the War Ships of the World, 1893.
Schlesische Krieg von Friedrich der Grosse, 1740-42.
Artillery: Its Progress and Present Position. By E. W. Lloyd and A. G. Hadcock.
How to Decipher and Study Old Documents. By E. E. Thoyts.
The Army and Navy Calendar, 1893-94.
Colored Plate: The Capture of Fort Armstrong, Kaffir Land, 22nd February, 1851.
The Annals of Electricity, Magnetism, and Chemistry, and Guardian of Experimental Science. Conducted by William Sturgeon, Vol. I., 1837.
Lectures on Electricity. By William Sturgeon, 1842.
The Rise of the British Dominion in India. By Sir A. Lyall, K.C.B., D.C.L.
Sketches in Afghanistan. By James Atkinson, 1842.
The Siege and Bombardment of Sebastopol. By an Artillery Officer. Lithograph.
Aquaprint of the Field of Waterloo as it appeared on the morning after the memorable 18th June, 1815.
Records of the Royal Military Academy, Woolwich, 1741-1892.
Carte du Haut-Niger au Golfe de Guinée, 4 sheets, par le Capitaine Binger.
Military Topography, by Major-General W. E. Montagu, C.B.
Eastern Legends and Stories, in English verse, by Lieutenant N. Powlett, R.A., 1873.
Rules and Regulations for the Sword Exercise of the Cavalry, 1796.
Memoirs of the Marchioness de Larochejaquelein, with Map of the Theatre of War in La Vendee. Translated from the French, 1816.
The Royal Military Chronicle, or British Officers' Monthly Register, Chronicle, and Military Mentor, 1813, '15, and '16.
Uniformenkunde, Lose Blatter zur Geschichte der Entwicklung der Militarischen Tracht. Vol. IV.
The Full Proceedings of the General Court Martial held at Brighton Barracks, by which Captain R. A. Reynolds, 11th Hussars, was tried on 25th September, 1840.
The Elements of the Science of War, 3 Vols., by William Muller, 1811.

Souvenirs sur la Révolution, L'Empire et la Restoration. Par Le Général Comte De Rochechouart.
Gunner Jingo's Jubilee, by Major-General Tom Bland Strange, late R.A.
Manual of Army Telegraphy (Field Telegraphs).
Memories of the Mutiny. Vols. I. and III. By Colonel F. C. Maude, V.C., late R.A., and J. W. Sherer, C.S.I.
Campaigns of Field Marshal the Duke of Wellington.
The Military History of the late Prince Eugene of Savoy, and of the late John, Duke of Marlborough. 2 Vols.
La France sous les Armes. Par Le Lieut.-Colonel Hennebert.
The German Artillery in the Battles near Metz, by E. Hoffbauer; translated by Captain Hollist, R.A.
Atlas to the Memoirs of John, Duke of Marlborough.
Die Vermehrung der Feldartillerie, vier Studien von Arnold Schumacher.
Armenia, and the Campaign of 1877, by C. B. Norman.
The Points of the Horse, by Captain M. H. Hayes.
Six Crimean and Baltic Sketches.
Panoramic Sketch of the Position on the Alma, by Major E. B. Hamley, R.A.
Colored Lithograph of the Battle of Balaklava, 25th October, 1854, by Lieut.-Colonel J. M. Adye, R.A., and Captain G. LeM. Tupper, R.H.A.
Map of the North-Western Frontier of India, showing the Pamir Region and part of Afghanistan.
Moltkescher Strategie, Gravelotte und St. Privat, 18th August, 1870.
Adventures de Guerre au Tempes de la République et du Consulat, par Moreau de Jonnés.
Eiuzeldarstellungen von Schlacten aus dem Kriege Deutchlands gegen de.
Französische Republik, 1870-71. Five Parts, Major D. Kunz.
Die Entwickelung du Feldartillerie, 2nd Vol.
Publications of the Hakluyt Society, from 1849 to date, 78 Volumes.
Big Game Shooting, 2 Vols., by C. Phillips-Wolley and others.
Moltke's Tactical Problems, from 1858 to 1882.

APPENDIX F.

Presentations to the Museum.

Four Uniform Jackets, with rank badges, &c., and a Tarbooch, as worn by European officers of the Egyptian Artillery	Lieutenant C. Lyon, R.A.
Eighty Humming and various other Birds from British Guiana, collected by the late H. Whitely, jun. ...	H. Whitely, Esq.
The Skin of a Boa Constrictor, mounted on a board...	
Two War Spears, three Hunting Spears, one Shield, one Drum and Stick, and two Battle-axes, formerly the property of the late General Gordon of Khartoum, and bequeathed to the Royal Regiment of Artillery by the late Miss Mary Augusta Gordon	

Burmese Map of the Ruby Mines, Burma, found in the Palace at Mandalay ...	Captain W. J. Honner, R.A.
Hippopotamus Skull, shot in St. Lucia Bay by Battery Sergt.-Major J. Shaw, R.A.	Major-Gen. O. H. A. Nicolls.
Kurdish Saddle, with fittings complete...	Capt. F. R. Maunsell, R.A.
Imperial Staff Officer's Hat, New South Wales Artillery	Major W. S. Churchward, R.A.
Helmet, with plume, as worn by the Osmanli Horse Artillery	Major C. B. Piers, late R.A.

APPENDIX G.

List of Papers published in the "Proceedings" during the Year.

The Strategical Geography of Europe. By T. M. Maguire, Esq., LL.D., Inns of Court Rifle Volunteers. *(Notes of a Lecture delivered at the R.A. Institution, Monday, November 28th, 1892).*

Breeching for Wagon Horses. By Lieut. J. A. Hobson, R.A.

Notes on Optical Instruments. By Capt. D. G. Prinsep, R.A.

The Value of a High Site for Coast Artillery. By Major J. R. J. Jocelyn, R.A.

The Effect of the Rotation of the Earth on the Motion of Projectiles. By E. T. Dixon (*late* R.A.), Trinity College, Cambridge.

Diary of Lieut. Ingilby, R.A., in the Peninsular War. Contributed by Major E. A. Lambart, R.A.

Battery Messing. By Lient.-Colonel J. C. Gillespie, R.A.

The Minden Batteries R.A. Communicated by direction of the Duputy-Adjutant-General, R.A.

Modern Gunpowder and Cordite. (A Lecture delivered at the R.A. Institution, January 23rd, 1893.) By Lieut.-Colonel F. W. J. Barker, R.A.

Memoirs, Historical and Biographical. The Brome-Walton Family. By Major and Quartermaster R. H. Murdoch, R.A. (Assistant Superintendent of Records.)

A Method of Concentrating the Fire of a Group of Guns laid for direction by Graduated Arcs. By Major A. C. Hansard, R.A. (Instructor in Gunnery.)

Extracts from the Diary of Lieut. Ingilby, R.H.A., during the Waterloo Campaign. Communicated by Major E. A. Lambart, R.A.

The Artillery of Three Armies. Communicated by the Secretary.

Abstract of the Proceedings of the Fifty-Six Annual General Meeting of the Royal Artillery Institution.

The Attack of a Coast Fortress. (Duncan Gold Medal Prize Essay, 1893.) By Major F. B. Elmslie, R.A.

The Attack of a Coast Fortress. (Silver Medal Prize Essay, 1893.) By Major R. F. Johnson, R.A.

The Attack of a Coast Fortress. (Commended Essay, 1893.) By Lieut. C. Kenny, R.A.

Remarks on Making or Breaking. By Captain W. H. Cummings, R.A.

The "Lining-Plane" of the German Field Artillery. By Captain W. A. Macbean, R.A.

Volunteer Adjutancies. By Lieutenant F. E. Freeth, R.A.

The Spanish Gunfactory and Arsenal of Trubia. A Review. By Lieut.-Colonel J. C. Dalton, R.A.

The Value of Mobility for Field Artillery. Précis of a Lecture delivered at Shoeburyness, May 2nd, 1893. By Major E. S. May, R.A. Published by order of the D.-A.-G., R.A.

Letters from General H. Lynedoch Gardiner, C.B., Colonel-Commandant Royal Artillery.

Adjuncts of Defence. By Major Sir G. S. Clarke, K.C.M.G., R.E.

Horses' Snow Shoes. By Colonel C. J. Deshon, *D.-S.-O.*, *late* R.A.

A Proposed Method of Firing at Moving Objects at Moderate Ranges. By Captain J. U. Coates, R.A.

Practical Hints on the Selection, Treatment, and Training of Australian Remount Horses in India. By Major J. Hotham, R.H.A.

Penetration and Effect of Projectiles on Earth and Masonry. By Colonel J. B. Richardson, R.A.

Journal of Major George Brooke, 1st Brigade Bengal Horse Artillery—1838. By Major-General F. W. Stubbs, *late* R.A.

Royal Trophy Guns at Windsor. (Report by Major R. H Murdoch, Assistant Superintendent R.A. Records.) Communicated by order of the Deputy-Adjutant-General, R.A.

Tactical Problems. By Captain J. E. Edmonds, R.E.

Self-Adjusting Firing Lanyard for Field Artillery. (With Fuze Key attached.) By Lieut. C. B. Simonds, R.H.A.

Siege of Minorca, 1756. By an Officer who was present at the Siege.

A Proposal for the Supply of Ammunition in the Field. By Major R. Wynyard, R.A.

Note on Infantry Tactics. By Lieut.-General Sir W. J. Williams, K.C.B.

Lectures for N.-C.-O. and Men of Field Artillery. By the *late* Captain G. L. W. Grierson, R.H.A.

A Visit to Aspern and Wagram. Being an account of the passage of the Danube by Napoleon, in 1809. By Major E. S. May, R.A.

Some Notes on Naval Gun-drill and Practice. By Captain P. E. Gray, R.A.

Clipping of Troop Horses. By Major G. R. Challenor, R.A.

Army Schools. By Major A. M. Murray, R.A.

Horse Artillery Guns at Waterloo. By Colonel F. A. Whinyates, *late* R.H.A., and General H. Lynedoch Gardiner, C.B., Equerry to the Queen.

A Method of Evaluating Corrections in the case of Quick Targets. By Lieut.-Colonel J. R. J. Jocelyn, R.A.

Hints on Replacement of Casualties. By Major E. C. Hawkshaw, R.A.

Entraining Elephants at Jhansi. By Major J. H. Rosseter, R.A.

The French Soudan up to date—November 1893. Compiled from the French accounts in "Le Temps" (with permission.) By Capt. S. P. Oliver, *late* R.A.

Note on the Correction of Artillery Fire. By Major P. A. MacMahon, R.A.

Okehampton Experiences, 1893. By Major A. J. Hughes, R.A. *(A Lecture delivered at the Royal Artillery Institution, 12th October, 1893.)*

General Chanzy's Campaign; Loire to Sarthe. December 1870 to January 1871. By T. M. Maguire, Esq., LL.D., Inns of Court Rifle Volunteers. *(A Lecture delivered at the Royal Artillery Institution, 1st November, 1893.)*

Defence of Estuaries, Harbours, etc., against Torpedo-Boat Attack. By Captain J. C. Wray, R.A.

Some further remarks on Horse Artillery Guns at Waterloo, in answer to Major Murdoch, R.A. By Colonel F. A. Whinyates, late R.H.A.

APPENDIX H.

Précis and Translations Published during the Year.

FRENCH. ...	"Revue d' Artillerie." Schläpfer Automatic Brake. By Lieut. d' Artillerie Schwob. By Lieut.-Colonel F. E. B. Loraine, *late* R.A.
	"Revue Militaire de L'Etranger." July, 1892. The Military and Naval Power of the United States. By Lieut.-Colonel J. H. G. Browne, *late* R.A.
	"Revue Militaire de L'Etranger." January, 1893. Tactical Observations. By General Dragomirov. *Précis* by Lieut.-Colonel J. H. G. Browne, *late* R.A.
RUSSIAN....	"Oruzhennii Sbornik." 8th December, 1892. The Electric Welding of Metals. By S. Von Ditmar. By Lieut. E. A. Campbell, R.A.
	"Russian Artillery Journal." The Military Training of Field Artillery. By Major E. A. Lambart, R.A.

APPENDIX I.

LIST
OF
FOREIGN MAGAZINES AND JOURNALS
TAKEN IN BY THE
R.A. INSTITUTION;

WITH THE NAMES OF OFFICERS WHO HAVE UNDERTAKEN TO SUPPLY PRÉCIS AND REVIEWS OF THEIR CONTENTS FROM TIME TO TIME.

COUNTRY.	NAME OF JOURNAL, ETC.	TRANSLATOR.
France	Spectateur Militaire	
	Journal des Sciences Militaires	Capt. J. F. Manifold.
	Revue d'Artillerie	Lt.-Col. F. E. B. Loraine, *late* R.A.
	Revue Militaire de l'Etranger	Lt.-Col. J. H. G. Browne, *late* R.A., and Capt. E. J. Granet.
Spain ...	Revista Militar Espanola ...	Lt.-Col. J. C. Dalton.
	Memorial de Artilleria	„ „
Germany	Neue Militärische Blätter ...	—
	Archiv für die Artillerie-und-Ingenieur-Officiere	Major R. M. B. F. Kelly.
	Militär-Wochenblatt	Major E. S. May.
Austria...	Organ der Militär-Wissenschaftlichen Vereine	—
	Militärische Zeitschrift... ...	—
	Mittheilungen,&c.,des Artillerie- und Genie-Wesens	Major L. C. M. Blacker.
Italy ...	Giornali di Artigleria e Genia...	Capt. H. de T. Phillips.
	Rivista „ „ „	Major R. M. B. F. Kelly.
Russia ..	Journal of Artillery ...	Major E. A. Lambart. Major G. T. Kelaart.
	Russki Invalid	Major E. A. Lambart.
	Oruzhennii Sbornik	Lieut. E. A. Campbell.
Servia ...	Journal of Military Science, &c.	—
Sweden ...	Artilleri-Tidskrift	—

WHAT IS THE BEST TACTICAL ORGANISATION AND SYSTEM OF TRAINING MASSED BATTERIES OF HORSE AND FIELD ARTILLERY?

BY

MAJOR J. L. KEIR, R.A.

"UNION IS STRENGTH."

"DUNCAN" GOLD MEDAL PRIZE ESSAY, 1894.

In treating this subject it is proposed to divide it into two parts. The first will be devoted to a consideration of the best tactical organisation for our Field and Horse Artillery with a view to its formation in masses. The second to the best means of training it when so organised.

Organisation.

Owing to the peculiar conditions under which our army has to serve, it is impossible for us to copy, in its entirety, any foreign organisation, no matter how good it may be, and although we may be able to learn much from our neighbours in the management of our army, any attempt to reproduce too closely their systems will probably result in failure.

It may be instructive, however, before proceeding further, to examine from a general point of view the present artillery organisation of the leading European nations. And in order to be able to form a comparison between these and that of our own army, an endeavour will be made to arrange the headings in the same order in each case.

Germany. Units.

In this country the highest artillery unit is the Brigade which consists[1] of two regiments, and is commanded by a Major-General or Colonel, who has the following staff:—1 Adjutant (a First Lieutenant), 1 officer of the Corps of Artificers, 2 or 3 Sergeant Artificers, 2 non-commissioned officers as clerks, and 1 mounted orderly. A regiment is composed of 3 (in some cases 4) "*Abtheilungen*" and is commanded by a Colonel or Lieut.-Colonel. An "*Abtheilung*," which is a unit as separate as are the battalions of an infantry regiment both tactically and administratively, is commanded by a field officer and consists of 3 or 4 batteries. These may be either all field batteries or all horse batteries, or a mixture of both. A battery has 6 guns and 9 wagons.

Artillery of an Army Corps.

To each Army Corps is allotted a brigade of artillery apportioned as follows:—

To 1st Infantry Division, 2 *Abtheilungen* of 3 batteries, each of 1st Regiment.

To 2nd Infantry Division, 2 *Abtheilungen* of 3 batteries, each of 2nd Regiment.

To Corps Artillery the 3rd Field and 4th *Abtheilungen* of the 1st Regiment and such batteries of the 3rd *Abtheilung* of the 2nd Regiment (which *Abtheilung* consists of batteries of Horse Artillery) as

[1] *Vide* "Armed Strength of German Empire," p. 92.

are not attached to the Cavalry Division—generally two, and the 4th *Abtheilung* of the 2nd Regiment.

Total batteries per Army Corps 23 (21 field and 2 horse). Therefore, with 24,000 infantry and 138 guns in an Army Corps they allow 5·7 guns per 1000 infantry.

France. Units.

Here again we have a brigade as the largest unit—which, as before, consists[1] of 2 regiments and is commanded by a Major-General, who has for his staff 1 orderly officer; 1 Major, chief of the Staff; 3 reserve officers attached (2 Captains of 1 Lieutenant or Sub-Lieutenant); 1 mounted (*garde d'artillerie*); 2 staff clerks (1 Corporal and 1 private); 6 gunners for escort (1 Corporal-Trumpeter and 5 Horse Artillery gunners).

A regiment is divided into 4 groups of 3 batteries each and is commanded by a Colonel.

A group of 3 batteries is commanded by a Major, who has for his staff—2 Lieutenants or Sub-Lieutenants, 1 Lieutenant for supply officer.

A battery has 6 guns and 9 wagons.

Artillery of an Army Corps.

The 1st Regiment of the Brigade finds the divisional batteries, the 2nd Regiment the Corps Artillery.

They are distributed as follows:—

1st Infantry Division: Nos. 1, 2, 3, 4, 5 and 6 Batteries of 1st Regiment.

2nd Infantry Division: Nos. 7, 8, 9, 10, 11 and 12 Batteries of 1st Regiment.

Corps Artillery: Nos. 1, 2, 3, 4, 5 and 6 Batteries of 2nd Regiment; 10 and 11 Horse Artillery Batteries.

2nd Regiment: No. 12 Horse Battery is sent to one of the independent cavalry divisions, and 7, 8, and 9 Batteries of 2nd Regiment are available for reserve formations.

Staff of Divisional Artillery. The Colonel, or the Lieut.-Colonel of the 1st Regiment commands the artillery of the divisions, and has for staff 2 Lieutenants, or Sub-Lieutenants.

Staff of Corps Artillery. The Colonel of the 2nd Regiment of the brigade commands the Artillery of the Corps and has a similar staff to the above.

Total batteries to an Army Corps 20, or 120 guns. Infantry in an Army Corps about 24,000 and therefore 5 guns per 1000 infantry.

Russia.

The Field and Horse Artillery are organised[2] separately.

Units.

A Field Battery Brigade consists of 6 batteries, and is commanded by a Major-General, who has 2 officers for his staff: a Brigade Adjutant, a Paymaster and Quartermaster.

The Horse Artillery batteries are not organised by brigades, but attached by pairs to the different Cavalry Divisions.

A field battery consists of 8 guns, and the heavy have 16, the light, 12 ammunition wagons. Half the Battery Commanders are Colonels and the other half Lieut.-Colonels, the other officers are 2 Captains and 3 Lieutenants. Total 6.

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[1] *Vide* "*Aide Mémoire de l'officier d'état Major en campagne.*"

[2] *Vide* "Armed Strength of Russia," p. 84.

A horse battery has 6 guns and 12 wagons and is commanded by a Colonel or Lieut.-Colonel with 1 Captain and 3 Subalterns under him.

A Brigade of Field Artillery (48 guns) is attached to each division. Artillery of an Army Corps.
There is no Corps Artillery.

Total batteries in an Army Corps 12 (8 guns each).

Infantry in an Army Corps 31,000. There are therefore only 3·1 guns per 1000 rifles.

In this country, also, the Field and Horse Artillery are organised[1] separately. Austria.

The Field Artillery has 2 units, the Corps Artillery Regiment, and the independent Cavalry Division. Units.

Each *Corps Artillery Regiment* is composed of a Regimental Staff and 2 Battery Divisions, each of which consists of 3 batteries. The 1st Division numbered 1 to 3, the 2nd 4 to 6.

An independent battery division consists of a small Divisional Staff and 3 field batteries numbered 1 to 3; these batteries are in all respects similar to those of the Corps Artillery Regiments.

For administrative purposes the Corps Artillery Regiments and independent battery divisions of each Army Corps constitute an Artillery Brigade under the command of a Brigadier attached to the Headquarter Staff of an Army Corps. Artillery of an Army Corps.

Artillery Brigadiers are usually Major-Generals or Colonels; and Commanders of Corps Artillery Regiments are Colonels. Battery Divisions are commanded by Lieut.-Colonels, batteries by Captains. Thus, each Infantry Division has an independent Battery Division (3 batteries of 8 guns), while the Corps Artillery Regiment has 6 batteries of 8 guns. Total 12 batteries of 8 guns = 96 guns.

A field battery consists of 8 guns and 8 wagons.

Infantry in an Army Corps 28,000. Therefore 3·5 guns per 1000 rifles. The Horse Artillery is organised in Battery Divisions of two batteries.

A horse battery has 6 guns and 6 wagons.

In Italy the Horse and Field Artillery have a separate organisation.[2] Italy.
They have only one Regiment of Horse Artillery which consists of 6 batteries (each of 6 guns and 6 wagons). In war this regiment is divided into 3 brigades, each of 2 batteries, told off for duty with the 3 Cavalry Divisions. Units.

They have 24 regiments of Field Artillery divided into 12 divisional and 12 corps regiments.

Each regiment consists of 2 brigades—each brigade of 4 batteries. The batteries of a regiment being numbered 1 to 8, each consists of 6 guns and 6 wagons.

A heavy brigade of 9^{cm} guns is attached to each division of infantry.
The Corps Artillery consists of 2 mixed brigades of 2 batteries of 9^{cm} guns and 2 batteries of 7^{cm} guns. Total in Army Corps—16 batteries or 96 guns. There are 25,000 infantry in an Army Corps: $\frac{96}{25} = 3{\cdot}8$ guns per 1000 infantry. Artillery of an Army Corps.

In this country there are 80 field batteries and 20 horse. England.

[1] *Vide* "Handbook of Military Forces of Austria-Hungary." Chapter III., p. 52.
[2] *Vide* "Handbook of the Italian Army."

Units.

The largest artillery unit is the Brigade Division, which consists of 3 batteries of Horse or Field Artillery. These Brigade Divisions are not permanently organised, but are formed locally wherever possible, and consist of the batteries which happen to be stationed at the places where the units can be formed.

Artillery of an Army Corps.

The British Army Corps is composed of 3 Infantry Divisions, to each of which a Brigade Division of artillery is attached.

The Corps Artillery consists of 5 batteries (3 horse and 2 field). There are therefore 14 batteries or 84 guns in an Army Corps. Infantry in an Army Corps 24,000 $\frac{84}{24} = 3{\cdot}5$ per 1000.

By Army Order 127 of July 1893, the artillery of the "Field Force" which is to consist (speaking roughly) of an Infantry Division and a Cavalry Brigade, will be 3 batteries Royal Artillery and 2 batteries Royal Horse Artillery. Therefore the proportion of guns will be $\frac{3.0}{8} = 3{\cdot}7$ per 1000 infantry.

Staff. The staff of the Divisional Artillery of an Army Corps consists of 2 officers (the Lieut.-Colonel and his Adjutant) 1 clerk and 4 non-commissioned officers and gunners (this includes servants).

The staff of the Corps Artillery consists of 6 officers, viz.: the Colonel Commanding the Corps Artillery and his Adjutant, the Lieut.-Col. Commanding the Royal Horse Artillery and his Adjutant, the Lieut.-Colonel Commanding the Field Artillery and his Adjutant.

The staff of the officer Commanding the Artillery of an Army Corps (a Major-General) consists of his A.-D.-C. and Brigade-Major, 1 clerk, 6 non-commissioned officers and gunners (including servants).

From the above it will be seen that while all the leading European nations organise their artillery into regiments and brigades, varying in strength from 144 to 48 guns, each with the same staff that they will take on service; our highest permanently organised unit is the Battery, Brigade Divisions being only formed in certain fixed stations in England and India. Also we have no permanent staff for units above the Brigade Division.

Foreign organisations unsuited to British requirements.

The chief reasons for this are (1) The necessity for quartering our batteries in numerous small stations scattered throughout the United Kingdom. (2) The frequent changes in the position of batteries necessitated by the Indian reliefs, both of which causes would render the formation of larger units a practically paper organisation and one which would confer no real benefit. Now advantages are gained from the formation of large units when the commander of the whole can, from time to time, collect and exercise his united command in the field; and also, when it is necessary, to permanently allot to a large number of Army Corps their respective forces of artillery. Neither of these conditions exist in our country, where there is but one training ground for a large force of guns, and the 3 Army Corps for Home defence having only a paper organisation are without commanders or fixed head-quarters. There is, therefore, no advantage in organising the artillery in large units prior to mobilisation. Furthermore, any organisation of this kind which might be suitable for England, would probably prove unsuited to the requirements of the army in India, and would greatly complicate the reliefs.

Comparison between British and Foreign organisation.

For these reasons we have adopted the system of District Commands.

The batteries destined to form part of the three Army Corps for Home defence being those located at certain stations. Thus, the place at which a battery is quartered denotes the unit to which it will belong on mobilisation. This being so, it becomes of great importance that we should, from time to time, test the organisation of our Army Corps units, by concentrating those batteries most nearly situated to our manœuvre ground, and exercising them under a complete staff. But here comes in the question of finance, and the problem before us is, therefore, how we can without incurring much extra expense, or making radical changes in our present organisation, devise a scheme by means of which the senior commands in the Horse and Field Artillery can be exercised in the field to the greatest advantage, when the manœuvre ground is practically limited to one station.

Abolition of Corps Artillery.

There is one question, by no means a new one, which seems to be worthy of our attention, viz.: that of the abolition or retention of the Corps Artillery. On this subject Continental opinion appears at the present moment to be equally divided—Russia has none, and both France and Germany are undecided as to its advantages. Without going into the question from a Continental point of view, it would appear that its abolition would, in our army, be attended with several advantages. The following suggest themselves:—

Advantages of abolition from British point of view.

(1.) Owing to the size and organisation of our army the division will, probably both in India and England, be the unit more frequently employed than the Army Corps, and the permanent allotment to it of its due proportion of guns would make it a more complete and independent body.

(2.) The recognised necessity of giving to Divisional Commanders more independence of action than formerly, enhances the importance of placing under their command the means of giving prompt and full support to their infantry.

(3.) The artillery of an Army Corps would be divided into 3 groups instead of 4, and the system of command in masses thereby simplified.

(4.) One advantage claimed for having 3 infantry divisions in an Army Corps instead of 2 is, that the 3rd can always act as a reserve. Assuming that an Army Corps will, as a rule, move by two roads in preference to one, the division acting as reserve would move behind the leading one on that road on which the enemy would most probably be first encountered, and the remaining division with the Corps Artillery followed by the corps details on the other road.

In such a case the system of dividing the artillery among the divisions in preference to the formation of a separate Corps Artillery would be manifest, as the bulk of the guns (10 batteries) would be nearer to the point of attack.

By having a Corps Artillery there would be 8 batteries on the road furthest from the enemy, and the loss of artillery power would result.

Abolition of Corps Artillery would lead to increased expenditure.

Under this arrangement of the batteries of an Army Corps, the staff would consist of a Major-General Commanding the Artillery of the Corps, who would have under him 3 Colonels, each commanding a group of 5 batteries. A group would be formed into 2 Brigade Divisions, one of 3, and the other of 2 batteries. A Brigade Division of one of these groups would be composed of 3 Horse Artillery Batteries. As

this would entail additional expense, it may be considered a disadvantage.

The Brigade Division system.

It would appear that for personal command, 3 batteries with a frontage of 335 yards is about the maximum that one man can control. This corresponds with the space allotted to commanders of the other arms. Thus, the infantry battalion occupies a length of 350 yards in line, and a cavalry regiment (war strength) 336 yards in the same formation.

Brigade Division system applied to England.

Let us now see how we can best apply the brigade system for training our Horse and Field Artillery, with the present localisation of our batteries.

In England we cannot have localisation as understood in the Continental sense of the word, but still our forces are localised. Aldershot for instance is the recognised head-quarters of the force which will be first called on to take the field, and although the battalions, regiments, and batteries composing it alter from time to time, the head-quarters of the so-called division are localised there.

To consider how far this kind of localisation applies to our Field Artillery, a list is given below of the present positions of the 37 batteries included in our Home establishment. In this list a number has been given to each Brigade Division to assist reference, but it is not proposed that they should necessarily have numbers, as their position will be sufficient indication; and our designations have within the last few years been changed to an almost confusing extent.

1st	Field	Brigade	Division	...	Aldershot.
2nd	,,	,,	,,	...	Aldershot.
3rd	,,	,,	,,	...	Woolwich.
4th	,,	,,	,,	...	Shorncliffe.
5th	,,	,,	,,	...	Newcastle.
6th	,,	,,	,,	...	Colchester and Sheffield.
7th	,,	,,	,,	...	Weedon and Coventry.
8th	,,	,,	,,	...	Ipswich and Sheffield.
9th	,,	,,	,,	...	Longford and Athlone.
10th	,,	,,	,,	...	Limerick, Clonmel and Fermoy.
11th	,,	,,	,,	...	Exeter and Bristol.
12th	,,	,,	,,	...	Hilsea and Christchurch.

In the above list, the 1st, 2nd, 3rd and 4th Brigade Divisions are the only ones which require our special attention; as they form actual commands which can be exercised under their own Lieut.-Colonels in the field. The remainder (with one exception) consisting of batteries in two or more stations, are purely administrative ones, which give small scope to the Artillery Brigade Division Commander.

By arranging the batteries in a list in their order for foreign service, and taking the first 3 to form the 1st Brigade Division, the next 3 the 2nd, and so on to the 4th Brigade Division, we should have all the batteries next for foreign service at Aldershot; and the ones waiting to take their places at Woolwich and Shorncliffe. With these exceptions, the positions of batteries are immaterial, the commands of the last 8 Brigade Divisions being purely local, with no permanent connection with the batteries under them. These would be relieved as at present for convenience, and according to the necessities of the Indian relief.

To exemplify this, assume 3 field batteries as the annual Indian relief, and that in November, 1894, the 1st Brigade leaves for India. Under these circumstances it would be replaced at Aldershot by the 3rd Brigade Division from Woolwich, under its Lieut.-Colonel, which would become the 2nd Brigade; the old 2nd Brigade becoming the 1st. On the old 2nd Brigade (the present 1st) sailing for India in 1895, the 4th Brigade under its Lieut.-Colonel would replace it, becoming the 2nd Brigade. Explanation of system.

To avoid too frequent changes among batteries, those returning home would occupy the stations vacated by the ones moving to Woolwich or Shorncliffe.

The appointment to the Woolwich and Shorncliffe commands of specially selected Lieut.-Colonels of Field Artillery having one year's service in that rank, on the understanding that they would hold these commands for 4 years, would, it is held, tend to increased efficiency in our service. Applicants for Royal Horse Artillery and Lieut.-Colonels over 1 year's service being ineligible for these commands. System of Brigade Division command.

The chief advantages claimed for this system are the facilities which it affords to a portion of our Lieut.-Colonels of holding commands which they will have opportunities of first training, and afterwards manœuvring with other troops. The Commanders of the 3rd and 4th Brigade Divisions would be moved to Aldershot after two years at Woolwich or Shorncliffe, taking with them their whole command if possible, if not, such of it as would be required to complete their new Brigade Division there. Advantages claimed.

There are 9 batteries of Horse Artillery in the United Kingdom, 3 of which are at Aldershot and 2 at Woolwich. By adding the St. John's Wood battery to the latter, a second complete Brigade Division could be formed; so we have practically 2 complete Brigade Divisions available for our manœuvres. The system of command as existing at present, seems to be the one best suited to the case. Brigade Division system applied to Horse Artillery.

Provided Lieut.-Colonels were posted to the Royal Horse Artillery after one year's service in the Field Artillery, those selected for the Woolwich and Aldershot commands might serve two years at each station. But as the Woolwich batteries, together with the one in London, will frequently take part in the summer manœuvres at Aldershot or elsewhere, this would appear to be unnecessary.

By this means we could assemble annually at Aldershot at least 5 complete Brigade Divisions,[1] each commanded by its own Lieut.-Colonel, who would have been able to complete its preparatory training to his own satisfaction before bringing it on to the manœuvre ground. These 15 batteries (representing the artillery of an Army Corps) would provide the opportunity of moving and fighting as large a force of artillery as our senior officers would at present be called on to manœuvre in a mass. Annual assembly of 5 Brigade Divisions at Aldershot.

Moreover, such a force (15 batteries) when deployed would occupy an extent of about a mile, and it seems doubtful whether suitable positions for one of greater size could be found in the vicinity of Aldershot.

[1] 3 Brigade Divisions from Aldershot and 2 (1 R.A. and 1 R.H.A.) from Woolwich. The Shorncliffe Brigade Division taking part every alternate year in place of the Field Brigade from Woolwich.

Question of ammunition supply.

Before leaving the subject of organisation, there is the question of ammunition supply to be considered. An examination of the different methods employed in Continental armies, shows that they are unanimous in providing an ammunition column for every 3 batteries in the Divisional Artillery. The following table shows the number of rounds per gun carried :—

Table of Comparison of Amount of Ammunition Carried by European Nations.

	With Battery.			With Divisional Ammunition Column.			With Army Corps Ammunition Column.			With Cavalry Division Ammunition Column.			Total.		
	H.A.*	L.F.A.†	H.F.A.‡	H.A.	L.F.A.	H.F.A.	H.A.	L.F.A.	H.F.A.	H.A.	L.F.A.	H.F.A.	H.A.	L.F.A.	H.F.A.
France ...	162	141	...	65	47	...	65	70	...	...	...	...	291	258	...
Germany	167	147$\frac{5}{6}$	...	67$\frac{1}{3}$	68$\frac{1}{3}$	...	67$\frac{1}{3}$	57$\frac{1}{3}$	...	...	...	...	302	263$\frac{11}{16}$‖	...
Austria ...	152	128	...	...	110§	...	...	110§	...	100	...	...	252	238	...
Russia ...	130	150	108	135	135	108	43	43	36	...	...	...	308	323	252
Italy ...	151	142	130	...	...	73	...	160	99	56	...	...	207	302	302
England	110 (including 2 star shell.)	110 (including 2 star shell.)	...	78 (including 4 star shell.)	78 (including 4 star shell.)	...	72	72	...	...	...	...	260 (including 6 star shell.)	260 (including 6 star shell.)	...

* H.A. = Horse Artillery. † L.F.A. = Light Field Battery. ‡ Heavy Field Battery. § The Ammunition for the Corps Artillery Regiments is carried with the Army Corps Column, that for the independent Brigades with the Divisional Ammunition Column. ‖ *Vide* "Armed Strength of German Empire," p. 218; with addition for extra ammunition wagon in 1st line.

This table is compiled from information obtained from the official works on the armed strength of the chief European nations, and from the official handbooks of their forces.

Question of sufficiency of ammunition carried at present with our batteries.

What will at once strike anyone in looking over this table is that, although the total number of rounds carried by us in the field bears comparison with that carried by other armies, in the actual number of rounds carried with the batteries we fall far short of them. This is explained by the fact that both France and Germany have 9 ammunition wagons to 6 guns, while Russia has 2 wagons per gun for her heavy batteries and Horse Artillery, and 12 wagons to 8 guns for her light field batteries. As this is a subject of some importance, it is worth our while to examine it still further.

In Colonel von Lobell's Annual Report for 1892 (translated by Colonel Hildyard in the "Journal of the United Service Institution" for December 1893, p. 1357) when referring to the German artillery the following passage occurs:—

"The second line (of wagons) which followed formerly in rear of the divisions, and thereby far removed from its batteries, is now to follow the artillery formations, being massed by Brigade Divisions. With advanced guards, flank guards, &c., they are to follow the rearmost troops as previously. By the addition of a 4th ammunition wagon to the fighting battery, it is now in a position to sustain an action for at least 2 hours' duration, by which it is insured that no want of ammunition will arise before the arrival of the 2nd line of wagons. This is made doubly certain by the place of these wagons being laid down as not further than 600 metres (previously 800 metres) behind the firing position."

To find out what expenditure of ammunition, firing for 2 hours' duration, represents, we have the following data, viz.:—that the number of rounds carried in 6 limbers and 4 ammunition wagons (the 1st line) suffices for an action lasting the above time.

The 8 cm gun-limber carries 39 rounds (1 on gun-carriage).
" wagon " " 38 "
" " body " 48 "

Therefore, the total rounds in the wagon is 86, and as there are 4, they will carry 344.

That is $\frac{344}{6} = 57$ rounds per gun.

Therefore, the total rounds per guns in 1st line is 57 + 39 (gun-limber) = 96.

Similarly, the 9 cm gun has 84 rounds per gun with 1st line.

Thus, the Germans allow for the expenditure of 96 (or 84) rounds per gun before the arrival of the 2nd line of wagons, while we only allow for one of 72.

And, further, while their 2nd line brings them a reinforcement of 58 (or 52) rounds per gun, that brought by ours only amounts to 36.

If we work the problem of our ammunition supply out on paper the result is satisfactory, in so far as the Ammunition Column of the leading division would appear to arrive on the scene about three-quarters of an hour after its division had come into action. The practical experience of our neighbours, however, appears to lead them to the conclusion that, if all risk of running short of ammunition is to be avoided, the allowance of a much wider margin than this must be made.

Since writing the above, Major Lambart's very interesting article, translated from the "Russian Artillery Journal," has appeared in the March Number of the R.A.I. "Proceedings," on page 6 of which the following passage occurs:—"The very large expenditure of projectiles which we must expect in future battles renders it necessary to bring under the immediate control of the Battery Commander on the battle-field the whole of the battery wagons. Batteries at war strength consist—light batteries of 8 guns and 12 wagons; heavy batteries, 8 guns and 16 wagons; Horse batteries, 6 guns and 12 wagons, with a certain number of spare men and horses."

From this we see that Russia also is considering the question of an increase of the number of rounds available for immediate use with her batteries.

Maximum expenditure of ammunition in modern battles.

More light may be thrown on this subject by the following data gleaned from the experiences of the Franco-German War. The maximum number of rounds fired by artillery was 230 at Mars-la-Tour (for any one gun). There were but 10 cases when a battery fired over 1000 rounds, and the average throughout the war was 36 per gun.

When reading the above, however, we must consider whether the introduction of smokeless powder and the improved breech mechanism of modern guns will not tend to increase the expenditure of ammunition in the battles of the future. The former facilitating rapid laying, and the latter rapid firing.

These are the considerations which have induced other nations to increase their supply of ammunition with the batteries.

Now, as an increase in the amount of ammunition carried with the batteries would necessitate changes in the composition of our two lines of wagons, a comparison with the systems in vogue on the Continent may perhaps assist us in arriving at a decision as to the best one to adopt.

France.

France has 3 wagons in the 1st line and 6 in the 2nd. The 3 right wagons of the 1st line accompany the guns into action and form behind the right limbers of sections. The remaining 3 take up position 300 metres in rear. The 2nd line (3) 550 to 850 yards in rear. Ammunition to be taken from wagons whenever possible.

Germany.

Germany has 4 wagons in the 1st line, 5 in the second. Two wagons from the 1st line take post 10 paces in rear of the guns behind the centre guns of half batteries. The remaining two with limbers take position about 200 paces in rear. The 2nd line take post 660 yards (in open ground when they cannot get cover nearer) behind the battery.

All 2nd line wagons are grouped together by *abtheilungen*.

Austria.

Austria, which has 8 guns per battery, has 4 wagons in 1st line and 4 in 2nd. In action the limbers are 15 yards in rear of their guns, and the wagons 30 yards in rear of the limbers.

Russia.

Russia (8 guns per battery). In Russia the 1st line consists of 4 wagons, which on coming into action, keeps as close as possible to the batteries. The 2nd line, consisting of 12 wagons, keeps at a distance of from 900 to 1200 yards in rear of the battery.

Italy.

Italy. The wagons are divided into two lines, each of 3. The limbers are 10 yards in rear of the guns. The 1st line is placed not

more than 100 yards in rear of the guns, the 2nd lines being grouped together and placed some distance in rear. One or two wagons of 1st line are brought up in line with the limbers.

The information given above is gathered from "armed strengths" and official handbooks.

England. The brigade or battery on leaving the line of march to advance into action is divided into two parts: (1) the guns; (2) the wagons. Until the batteries come into action, the latter remain from 200 to 400 yards from the former. When the guns move into position, 3 wagons are sent forward to supply the battery, and the 3 remaining ones with the limbers form the 2nd line, from 200 to 400 yards in rear of the guns. England.

An examination of these different systems appears to show (1) that it is usual to divide the wagons into 2 lines; (2) that the wagons of the 2nd line of the batteries of a Brigade Division are, as a rule, massed together, in order to place the control of ammunition more under the hand of the Brigade Division Commander. In our Regulations, the only direction for guidance as to the supply of ammunition to a higher unit than the battery appears in the following paragraph:—

"When a Brigade Division is in action the senior Captain will arrange for the distribution of wagons arriving from the ammunition column, and for the collection and despatch under proper charge of empty battery wagons to the Ammunition Column." ("Field Artillery Drill," Chap. IV., Section 13).

These instructions might perhaps with advantage be amplified by defining rather more fully the authority (presumably the Lieut.-Colonel) who controls the ammunition in the 2nd line. It is further urged that this arrangement should be worked out beforehand into a regular system, and that the system, whatever it may be, should be tested practically on the manœuvre ground before becoming a fixed regulation.

Should it be decided to increase the number of our wagons to 9 per battery (giving a total of 144 rounds per gun), the best division would appear to be 3 in the 1st line and 6 in the 2nd. The 18 2nd line wagons being massed under the senior Captain, acting under the direct orders of the Lieut.-Colonel Commanding the Brigade Division. This officer would at once establish communication with his Ammunition Column.

Lastly comes the question of the position of the wagons when an artillery force is marching with an army unit.

There is a strong prejudice in our Regiment against the separation of the gun from its wagon, which has found expression in the following paragraph (Section 3, Chapter. IV. "Field Artillery Drill") of our Regulations:—

"The Officer Commanding a battery must on no account permit his guns to push on in front of his wagons, nor must the Officer Commanding a Brigade Division ever allow the wagons of his batteries to be massed in rear of his guns, or to march separately from them." The system of marching gun with wagon.

The argument in favour of the above is that, although guns will easily enough obtain a free passage to the front of the column, there is likely to be some difficulty in persuading the advanced troops to make

room for a large column of wagons, and that, therefore, in order to avoid a temporary separation, it is necessary that the wagon should be part and parcel with the gun.

Now, although the principle on which the above regulation is based is a sound one, namely, that guns should never separate from their ammunition, it might be worth our while to consider whether this separation cannot be avoided, without having recourse to such an inconvenient arrangement as that resorted to.

Disadvantages entailed by this system.

The Corps Artillery marching with a wagon following each gun occupies a space of nearly three-quarters of a mile.[1] If the guns march first and the wagons are massed in rear, the space occupied by the former is about 800 yards. Consequently, by adopting the first formation you delay the deployment of the guns by the time taken to traverse the extra distance; you also increase the difficulty of communication with the Battery Commanders, and run the risk of considerable delay and confusion likely to occur in disengaging the guns from the wagons in confined spaces and narrow roads. The formation advocated is, that each battery should march with its guns in front, followed by 3 ammunition wagons (1st line), the remaining wagons of the 2nd line being massed in rear of the Brigade Division or Corps Artillery, with whom they should keep closely connected.

It is held that by definite Army Regulations on this subject the connection between batteries and their wagons can be maintained without the sacrifices just enumerated. In Captain Macbean's translation of the latest edition of the "German Field Artillery Drill Regulation" (*vide* "Proceedings," of the Royal United Service Institution, March 1893), the following paragraph occurs :—

"The second échelons (2nd line of wagons) are now to follow immediately in rear of the various units of the artillery arm—Divisional, Corps Artillery, &c. Formerly the second échelons were separated from the guns to which they belonged, and followed in rear of the fighting troop of each independent unit."

German method to mass 2nd line wagons in rear of artillery column.

The reason of this seems plain. The Germans have found it necessary to keep their guns and first supply of ammunition closer together than formerly. They have not, however, found it necessary to impede the rapid action of their artillery in order to carry out this change. The question would appear to be more an army than a regimental one. For if it be decided that it is expedient that batteries and brigades should be inseparably connected with all their wagons, both on the march and on advancing into action, we shall be enabled to adopt the formation which will give the fullest effect to our arm. If, on the other hand, the question is decided otherwise, we shall have to abide by that decision, and only take to the front with us the wagons fixed by regulation, still disposing these in the most advantageous manner to suit our movements.

Question not altogether an artillery one.

Proportion of guns to rifles.

Before leaving the subject of organisation it may be interesting to note how we stand in relation to foreign armies in the matter of the proportion of guns to infantry.

[1] Should 3 additional wagons per battery be added, this distance will be increased to close on a mile.

Austria has	3·5	guns	per 1000	Infantry.
France ,,	5	,,	,,	,,
Germany ,,	5·7	,,	,,	,,
Russia ,,	3·7[1]	,,	,,	,,
Italy ,,	3·8	,,	,,	,,
England	3·8[2]	,,	,,	,,

Artillery organisation for India.

Owing to the changes about to take place in our army in India, it would at present be useless to attempt to discuss any question of artillery organisation specially applicable to that country, where the conditions vary in many points from those at home, and the ground available for manœuvre is practically unlimited.

Chief points for consideration with regard to our present organisation.

To sum up, then, the following appear to be among the most prominent subjects for consideration with regard to our present organisation:—

(1.) The possibility of the annual assembly at our manœuvre ground of 5 completely trained Brigade Divisions, each under its own Lieut.-Colonel, representing the equivalent of the artillery of a British Army Corps.

(2.) The establishment of a system which affords to our Lieut.-Colonels opportunities of (*a*) training their commands as a separate unit; (*b*) exercising them as part of a mass in combination with other Brigade Divisions; (*c*) manœuvring them with other arms.

(3.) The question of the abolition of the Corps Artillery from a British point of view.

(4.) The question of the sufficiency or otherwise of the amount of ammunition at present carried with the batteries, compared with that carried by foreign nations.

(5.) The position of the artillery ammunition wagons in column of route on the line of march with other troops.

Training.

Training.

There seems to be a consensus of opinion on the part of modern artillerists, that in the next great war conflicts between large masses of guns will be one of the chief features of the battle-field. Taking into consideration the high standard which has been reached by Continental nations in the technical training of their batteries, we may infer that little advantage is to be gained in this direction when first-class military Powers are concerned, and that, therefore, victory will declare itself in favour of that side which, by careful training and organisation in time of peace, has best prepared its artillery for combined action under the direction of a single leader.

Importance of training our artillery to fight in masses.

What, therefore, is desired is a simple and practical procedure, by means of which one man can control, in the most effective manner, a large number of guns, whether in action or limbered up.

[1] Including 2 batteries Royal Horse Artillery with the Cavalry Division. Each Russian Corps having a Cavalry Division of its own.

[2] If we include the 2 Royal Horse Artillery batteries with the Cavalry Division of the 1st Army Corps, the total number of guns available for a general engagement will be 93, and the proportion of guns per 1000 infantry 4·3. With reference to this point, the following appears in Captain Macbean's translation before referred to. "The Horse Arillery batteries allotted to cavalry units will, in a general engagement, be employed with other arms, and should only be given back to the cavalry to carry out some special duty."

Great improvements that have been made in our artillery of late years.

During the past 10 years, thanks to the untiring efforts of some of our ablest officers, whose names are too well known to the Regiment to require any mention here, great improvements have been made in our Horse and Field Artillery. The batteries have been completely re-armed with a powerful breech-loading gun, and the ammunition supply simplified by the introduction of a uniform calibre. Numerous practice camps have been established in the United Kingdom and in India, and the high standard of the shooting of our batteries has advanced beyond the most sanguine expectations. The Brigade Division system of command has been firmly established, both in the field and on the range; and the supply of ammunition in the field from Ammunition Columns tested.

Lastly, the handling of artillery in masses has received much attention. Great, however, as our progress has been, much remains to be done before we can honestly claim that superiority which we once undoubtedly possessed, and which the quality of our *personnel* and *matériel* justifies us in hoping that we may some day regain.

The training of Horse and Field Artillery may be said to be divided under 3 main headings:—

Subdivision of training of Horse and Field Artillery.

(1.) Drill, which includes the performance of battery and brigade regulation movements, and has for some of its chief objects the training of the men and horses, and the perfection of the mobility and marching power of the batteries.

(2.) Shooting and exercises at the Practice Camp for the practical testing of our *matériel*, the training of our officers and men in Fire Discipline, and the improvement of the accuracy and rapidity of fire.

(3.) Tactical manœuvres in the field, in Brigade Divisions or larger bodies, either alone or in combination with the other arms of the service.

(1) and (2) the duty of junior officers.

The training in the first two cases comes under the heading of technical instruction, and chiefly concerns ourselves as a Regiment. Success in these being mainly dependent on the exertions of the officers, from Lieut.-Colonel downwards.

(3) the duty of senior officers.

In the third we take our place as a portion of an army unit, when our success mainly depends upon the ability with which the commands, from Lieut.-Colonel upwards, are exercised. The fact that it is not fair to demand of these officers in time of war services which they have had no opportunities of practising in peace has now been fully recognised, and we are under a deep obligation to Sir Evelyn Wood for the lasting benefit he has conferred on our Horse and Field Artillery, by bringing them in closer touch with the rest of the army, and in affording them opportunities of practising manœuvring, in combination with the other arms, under probable service conditions.

With the first two headings we are not at present closely concerned, but, in so far as they are steps towards the attainment of the third, they cannot be passed over without some brief comments.

In order to exclude from the parade ground all movements which cannot justify their existence, by giving proof of their necessity, let

each be examined and placed under one of the following four headings:

Parade Movements.

(1.) March formations.
(2.) Rendezvous formations.
(3.) Formations necessary for movement.
(4.) Fighting formation.

All that cannot stand this test may, we venture to think, be classed as superfluous, and removed from our manual on the ground that the presence of unnecessary formations in our drill-book militates against simplicity, and encourages those so minded to devote time which could otherwise be expended usefully in the mastery of confusing and useless details.

Direction as opposed to personal command.

Most of us who have recently taken part in manœuvres will admit the soundness of the remarks made by Colonel Maurice on the subject of the reconnoitring of artillery positions, when speaking at the discussion which followed the very interesting lecture delivered by Major Hughes, R.A., on the "Okehampton Experiences of 1893." With reference to the above subject, he says (p. 76, Vol. XXI., "Proceedings" R.A. Institution for February, 1894):—

"Anybody who has practically tried it will agree that whoever is in independent command, whether Brigade Division Commander or Battery Commander, has simply to be as far ahead as he can possibly get to be able to reconnoitre what the enemy is doing. The difficulty that Major Hughes speaks of ("Okehampton Experiences, 1893," p. 63, "there seemed rather a dislike on the part of the Brigade Division and Battery Commanders to leave their commands and advance well ahead to reconnoitre the next position") is a most natural one, and is produced almost entirely by drill as opposed to manœuvres."

Direction sometimes better than personal command.

Drill being the preparation for manœuvres, situations that are likely to occur in the latter should be foreseen and provided for in the former.

Now, the training of batteries or brigades may be carried out by two methods. By one of which the officer in charge assumes personal command, and orders all movements himself. By the other, he gives a junior officer a definite task to perform, allows him to carry it out in his own way, and on its completion criticises, if necessary, his method.

In our Regiment the first is nearly always the one made use of, with the result that the commander of a unit, either from force of habit or distrust of his juniors, has a tendency to remain too closely attached to his command.

By employing the second method, *i.e.*, that of direction as opposed to personal command, he places himself in the position of an onlooker, from which standpoint he is better placed for observing the working of his command than when personally ordering its movements. He is also in a more favourable position for instructing his junior officers in the manner in which he would like them to carry on the command during his unavoidable absence. A combination of these two methods is, therefore, advocated as the best training for the manœuvre ground.

With regard to the Practice Camp at Okehampton, there is only one suggestion we would presume to offer. The necessarily technical nature of the Okehampton report renders it of little interest to the army at large, who on this account derive little benefit from the valu-

Advantage of an infantry expert at R.A. Shooting Camps on staff of Commandant suggested.

able experience which we annually gain. The presence of an infantry officer on the staff of the Commandant, charged with the duties of arranging the targets according to the latest formations of his arm, and with the compilation of an annual report, giving the infantry view of the subject, and discussing fully tactical questions would, perhaps, alike benefit ourselves and the army generally.

Chief object of artillery tactical exercises.

We now come to the third phase of artillery training, previous to the discussion of which, it is assumed that the chief object in view is the devising of a plan which will give full scope for the exercising of our higher commands in the most useful manner; as, should the batteries have been perfected in the first and second phases of their training, they will be in a position to respond to almost any call which may be made on them when manœuvring with the other arms.

Artillery tactical exercises may be divided into two main classes:—

(*a.*) Those in which the artillery alone take part.

(*b.*) Those practised in combination with the other arms of the service.

Tactical considerations take precedence to technical ones.

Previous to the investigation of our subject under these two headings, one point suggests itself for consideration: Do we, while acting with other arms, pay sufficient attention to their position and movements, to the supposed tactical and strategical situation, and to the part we are playing to assist the commander of our army in carrying out his main object? For until we do, it is maintained that our advance in this portion of our training will be slow.

The first question, therefore, for the Artillery Commander is not "Where is the best position for my batteries?" but, "What is the intention of the General Officer Commanding the force?"

Artillery should always work with definite tactical object.

With this end in view, it is held that all tactical exercises in which artillery alone take part, should be framed on the supposition that they are acting with other arms, whose position should be indicated in the general ideas issued for the day. By this means all will be able to understand (1) the main object of the movements of the whole force with which they are acting, (2) the part which the artillery is playing to assist in the carrying out of this main object.

PART I.

(*a*) *Tactical Exercises in which the Artillery alone take part.*

Exceptional opportunities afforded in this case.

In this case opportunities are afforded of exercising the whole force at disposal against an imaginary enemy, and so practising evolutions on a larger scale than would be possible in acting with other troops, when in the majority of cases the batteries would be divided into two groups acting in opposition to one another.

Collisions between large bodies of troops take place:

(1.) When one side attacks and the other defends from a selected position.

(2.) When both sides are on the move, either with a view of mutual attack, or when one seeks to attack while the other is anxious to avoid or postpone an engagement. The first of these produces what is called a premeditated, the second what is called an accidental battle. In either case, ultimately, one attacks and the other defends. The conditions under which the deployments for attack would take place are, however, very different. Acting on the above assumption, it is proposed to investigate some tactical schemes for exercising artillery in the part they would probably be called on to play in such engagements. At present we shall devote our attention exclusively to the consideration of the premeditated battle, postponing the consideration of the accidental one until we come to deal with the subject of artillery manœuvres with other arms.

Conditions under which battles take place.

In the conduct of all kinds of manœuvres, the general principles which we propose for guidance are those most salient in the tactical exercises, initiated at Aldershot by Sir Evelyn Wood, for the practical training of artillery in large bodies, and which, we venture to think, owed much of their success to two main features:—

General principles for guidance at all artillery manœuvres.

(1.) The secrecy which was preserved as to time, place, and the nature of exercise.

(2.) The careful selection of suitable ground as little known as possible.

We have thus, thanks to his foresight, avoided the pitfalls against which a Swiss officer warns his countrymen in a recent article (translated by General Goodenough, in the January number of the "Proceedings of the United Service Institution"). In this he states that owing to want of secrecy with regard to the operations, not only were their manœuvres rendered useless, but that the effect produced was actually pernicious, as there was a tendency towards the creation of critics rather than men of action. The difficulties of representing the conditions of war in time of peace are so great, that we cannot afford to neglect an opportunity which gives the power of, to some extent, testing such qualities as quick insight and rapid decision.

Result of want of secrecy with regard to tactical exercises.

The principles which we propose are, then:—

(1.) That all information concerning an exercise about to be performed should be kept secret. Any laxity with regard to this point having the effect of depriving it of all value for anything but drill purposes.

Secrecy.

(2.) That the senior officer present should assume the part of director of manœuvres, draw out the plan of operations, nominate the officers to command and direct the compilation of the critique on the day's proceedings; but should take no part in the actual command, being present in the position of chief umpire or spectator. When this is not the case and the senior officer assumes command little is gained, as in the first place he cannot criticise his own procedure,

Director of manœuvres or chief umpire.

and in the second he will be so occupied with the conduct of the operations that he will neither have the time nor the opportunity of impartially surveying the operations as a whole.

(3.) All orders issued by officers holding commands above that of Battery Commander to be in writing, and according to a recognised artillery form. By this is meant that they should be arranged in normal sequence on the same principle as orders for a march, or for the attack of a position, etc. The object of this is :

Orders and their chief objects.

(*a*) To insure the rapid framing in the field of clear, concise orders, of uniform type.

(*b*) To enable the officer conducting the manœuvres to see what orders were actually given, and what have been omitted.

(*c*) To thoroughly test the system of transmission, and so render certain their speedy execution.

Criticism of all manœuvres.

(4.) That with a view to deriving benefit from the experience gained, a report be drawn up by Officers Commanding one or more Brigade Divisions, at the conclusion of each exercise, to which should be attached the original orders on which he acted. The officer conducting the manœuvres, from his own observation and these reports, publishes his remarks, with any orders he may consider necessary, to avoid a repetition of mistakes.

Recognised normal procedure by the artillery in order.

(5.) That, with a mass of guns in action, the following is the normal procedure :—

The Officer Commanding the troops having specified the purpose of the fight and the task of the artillery, the Officer Commanding Royal Artillery divides the target fixed on among the Group or Brigade Division Commanders, and gives general instructions for carrying on the fight (rate of fire, occupation of position, &c.).

The Battery Commander ranges his battery and fixes the projectile and order of fire.

The Brigade Division Commander must order all alterations in the target, the Battery Commander only being allowed to change his objective in case of threatened danger.

Means of estimating expenditure of ammunition.

(6.) That, as one of the chief difficulties in action in the future will be the supply of ammunition, a system is proposed for manœuvres, by means of which each battery registers the amount of ammunition it has expended by the number of minutes it has been in action, assuming the average rate of fire to be 4 rounds per minute. This will accustom the officers concerned to give due attention to this point and, it is hoped, lead to a regular replenishment of ammunition from the wagons in rear.

(7.) That the introduction of smokeless powder having greatly increased the importance of concealed positions for artillery, more attention than ever will have to be paid to the bringing of batteries into position, so as not to disclose them more than possible. As this movement can best be observed from a position some way from the batteries, it is proposed that an officer should always be placed at a commanding point in front of the guns, about where the enemy's artillery would probably be placed. At the conclusion of the exercise he should furnish a report, stating what he has been able to see, and noting the exact times when he saw it, the greatest rapidity in moving into the position, combined as far as possible with concealment from view, being the desideratum. Importance of concealed positions.

Preparatory positions always to be used when possible.

(8.) That it will always be assumed that a Brigade Division has its ammunition column attached to it. The position of these being in the first instance fixed, and their subsequent movements being regulated by the orders issued by the Brigade Division Commander, he can estimate their probable position at any future time. Position of ammunition columns to be always considered.

(9.) That as in extended artillery positions the communication of orders will have to be practised (by signal, telephone, or orderlies as directed) between Commanders of Groups and the Officer Commanding Royal Artillery, these officers must establish themselves at conspicuous stations behind the line, and during their absence have signallers at these points to read and forward messages. Best means of controlling a mass of batteries.

We will now proceed to consider the action of artillery in the different cases mentioned above.

(1.) The case in which it is acting on the defensive in a previously selected position and has ample time for preparation. This may be considered as the standing exercise for massed batteries, for in it the conditions are the simplest of all the problems to be solved. The batteries being already concentrated, with their ammunition columns within easy reach, two great difficulties at least are absent. Action of artillery in defensive position.

The general position of the line of guns being fixed, there remains the task of assigning to the various commanders their respective positions, and apportioning to them the avenues of approach, which it will be their duty to guard. Subdivision of target.

To carry out this in the most expeditious manner being the next object, the General Officer Commanding Royal Artillery of the Army Corps sends for his Corps Artillery and 3 Divisional Artillery Commanders, to whose adjutants his orders are dictated by his staff officer. Some of the headings of these orders would probably be—position of enemy, as far as known; target for each commander's Nature of orders of G.O.C., R.A. to group commanders.

guns; hour at which each or all are to move into position; position of Officer Commanding Royal Artillery. On receipt of these, the 4 officers mentioned above proceed to reconnoitre their positions and, having done so, issue their own orders to their respective commands, but do not rejoin them, as they would have to remain to observe the movements of the enemy. The orders issued by them would inform their subordinates of as much as is necessary for them to know concerning the orders they themselves have received, and supply details which apply specially to their commands. If intrenchments are to be used, the description and position of such works must be noted; also, the positions of ammunition columns and 2nd lines of wagons, with the name of the officer who is to command these latter.

Action of group commanders on receipt of orders.

Action of other officers on receipt of orders.

The senior officer present with the Brigade Division having received these orders, will assemble the Commanding Officers of the batteries and read them out to them, taking steps at the same time to communicate to the Officer Commanding the Ammunition Column and the non-commissioned officer in charge of the baggage any orders specially referring to them.

At a time appointed in orders the batteries will move into position.

The next object of the commander of the mass is to gain such command over his batteries that he will be able to concentrate the fire of all his guns on any part of the field in the shortest possible time. And here an opportunity will occur of testing the best means of communication between him and his 4 commanders. As it is considered that after guns are once in position and have engaged the enemy, their further action is hypothetical, being dependent on the movements of the enemy. We will not for the present endeavour to trace further their subsequent action.

Necessity of constant practise of some approved plan.

This completes the 1st exercise, and we may well imagine the remark—"But this is quite easy." It is easy, but it ought to be more than easy; it ought to be mechanical. Inasmuch, however, as all military training should be empirical, rather than theoretic, no plan can be considered satisfactory that has not been practically tested in the field. By practical experiment we will arrive at simplicity. By constant performance of the simple plan habit will come to us without the effort of thought.

Action of artillery acting on the offensive.

(2.) We now come to the 2nd case, viz.: that in which the artillery is acting on the offensive and attacking a known and previously prepared position.

Defending force to be represented.

In carrying out an exercise of this kind, it is suggested that the defence (in skeleton) should be entrusted to an officer, who should visit the ground some time previous to

the attack, and on a sketch, either enlarged from the ordnance map or made roughly on the spot, dispose the troops which the officer conducting the operations has allotted to him for the purpose. This officer, on the day of the exercise, should be posted at a commanding point in his position, and should furnish a brief report of the attack, as observed by him, with the times accurately noted.

Now, if the attacking force could, by a night march, have been brought within striking distance of its adversary, and the artillery have been placed in position before dawn, the case would be as simple as the last one. This, however, can rarely be counted on, and the problem is, as a rule, more complex.

Increased difficulties of attacker.

The Infantry Divisions marching to the attack would be at its commencement some miles distant, and probably moving by several roads, the attack having been begun by the battery of the advanced guard of the nearest division, we will assume that the time when this battery becomes engaged with the advanced posts of the defender is the commencement of the artillery operations.

Probable situation.

The Corps Commander having ridden on to reconnoitre the enemy's position with the General Officer Commanding R.A., discloses to the latter his plan of attack, and the knowledge he has gained of the numbers and position of the enemy (at manœuvres this information is embodied in a printed general idea). From this moment the work of the General Officer Commanding R.A. commences. Having summoned his Divisional and Corps Commanders, and fixed a time and place for meeting, he starts off with his staff officer to examine the ground with a view to issuing his orders for the disposal of his batteries. On returning to the appointed rendezvous, he points out on his map the positions he intends to be occupied by the respective commanders, and issues through his staff officer, any special orders he may consider necessary.

Procedure of G.O.C., R.A.

These should be taken down in writing by the respective Adjutants concerned. On receipt of these orders the Divisional and Corps Artillery Commanders issue the necessary additional orders to their respective commands, and, having done this, proceed to examine the ground which they are to occupy. These orders will name the roads by which the batteries are to advance to their positions, and the pace at which they are to move, and will fix a point at which they are to be met by an officer, to conduct them to a preparatory position (when there is one), and contain instructions as to the disposal of numbers, 2nd line of wagons and Ammunition Columns. Finally, they will state where the Lieut.-Colonel will await the arrival of his Majors, at a given time, to point out to them their positions. These officers should ride forward to meet him on the receipt of this order.

Orders by Group Commanders.

In moving into position, concealment from the enemy is of the greatest importance, as when smokeless powder is used a battery does not disclose its position on opening fire. For the same reason the reconnoitring of a position should be carried out as much under cover as possible, and by the Major alone, in most cases dismounted.

Reconnoitring and moving into position.

It will rarely happen that in positions where good cover is available, a large number of batteries will be brought into action simultaneously under personal command, as the old argument that single batteries coming into action will be crushed by superior fire no longer holds good.

Method of bringing batteries into position.

A single battery which has been brought up under cover, and which is firing smokeless powder, no longer draws upon itself the concentrated fire of a number of guns, while, on the other hand, it can range much more rapidly when firing alone than when part of a line of guns in action.

Difficulties of bringing several batteries into action by personal command.

Anyone who has watched a line of 3 batteries being brought into position, by sign or word of command from its Brigade Division Commander, on an at all cramped or difficult crest line, will be convinced of the difficulty of the task, and of the unnecessary exposure to view which it entails. By moving batteries in échelon, or refusing one or both flanks, the evil may be mitigated, but the best plan would appear to be to give Officers Commanding batteries a free hand, and not to hamper them, at this moment, by distracting their attention from more important matters to the details of drill.

In the absence of cover the deficiency must be counteracted by rapid simultaneous movement.

When the last of the batteries has come into position the time should be noted, and the opportunity would seem a favourable one for the director of manœuvres to inspect the general position.

Guns only to be placed where they can be worked.

To avoid the perching of guns on razor-topped crests, where they could not remain in practice, no gun should be allowed to be placed in a position where it has not room to recoil at least two complete revolutions of the gun wheels.

This brings us to the conclusion of the second tactical exercise.

The accidental battle.

The case in which two forces come into contact when both are on the move, will present more difficulties to the Artillery Commander than either of the preceding ones, on account of the uncertainty of the task before him. The greater distance between the advanced guard and the main body, in case of the attacker, will require great quickness of decision and rapidity of movement if the retiring enemy is to be brought to a stand in time for the infantry to arrive and fight a decisive action before night.

As the conditions of such a fight must be dependent on the movements of the enemy, opportunities for the practice of this kind of engagement will be best afforded in tactical manœuvres in combination with other arms. This brings us to

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PART II.

Tactical Exercises in Combination with other Arms.

Being now in the position of having an enemy, we shall be able to continue our examination of the conduct of artillery in masses beyond their first encounter with him.

Now, although our text-books sketch out a form of procedure for the action of artillery during the so-called phases of a fight in a modern

battle, based on the opinion of those most capable of judging, no one supposes that this will of necessity be rigidly adhered to. One thing is, however, certain, that the main target for artillery fire is the infantry. A target whose formations, movements, positions, and tactics generally, we cannot study too closely in every detail.

Main target for artillery is the infantry.

The extended nature of modern battle-fields, combined with the accidents incidental to them, will often place artillery officers in positions where they must act on their own responsibility, and as military education and close observation are necessary to enable us to know where to seek for opportunities in the first place, and how best to profit by them in the second, it follows that officers who have studied the tactical problems, with a view to ultimate solution in actual war, will be far better situated than others who may have been contented to limit their view of the general operations, to the individual efforts of their own branch of the service. And while having every confidence in the undoubted power of our artillery, let us not sacrifice one jot of its full effect by want of sympathy and combination with the other arms.

Tactical knowledge assists bold and rapid action.

The individual importance of no arm has perhaps been increased more by the introduction of smokeless powder than that of artillery. Formerly, shrouded in dense volumes of smoke it was enabled to gain but an imperfect view of the battle-field. The smoke has been removed, and we shall, in future, see clearly. If, therefore, it was formerly of importance for an Artillery Commander to have a complete understanding of the workings of the other arms, to enable him to follow their action through its various phases, and so to know when, where, and how to strike his hardest blows with most telling effect; has not the possession of this faculty become, in the present day, an absolute necessity?

Use of smokeless powder enhances importance of tactical knowledge.

It may be said that a faculty of this kind is a gift bestowed on few. On few perhaps to the highest degree, but, nevertheless, one which all to some extent possess, and which may, by cultivation, be considerably developed. How best to cultivate this important faculty is therefore the next consideration. The answer to this may be briefly stated in the words: Theoretical study, and practical experience. By the former is meant the teachings of tactics gained by experience in the past, tempered by the modifications which will probably be produced by recent inventions. By the the latter, service in the field, in the absence of which, manœuvres of the most realistic kind must be substituted. Manœuvres may be called a very poor substitute for actual service in the field, and that this is so cannot be denied; but until human ingenuity devises something more representable of actual warfare, we must be content with the makeshift. That, however, practical and well-planned manœuvres are of great use, and that their value varies in proportion with the spirit in which they are entered upon by those who take part in them, and with the use to which they are put as an aid to solving tactical problems, will be generally admitted. Were proof of this necessary, it is amply provided by the great attention paid to them by all Continental nations, in spite of their comparatively recent experiences in modern fighting.

Necessity of study and practical experience.

Importance of manœuvres.

The commanding position occupied by artillery affords to its officers exceptional opportunities of watching the progress of an action. That

Exceptional opportunities afforded

to artillery officers for watching progress of a fight.

the turning to account of these opportunities in peace will be of assistance in rendering them more capable of forming a correct judgment of how to act in war, few will deny.

The officer who possesses a knowledge of the tactics and formations of cavalry and infantry will have no difficulty in deducing from the movements he sees, combined with his knowledge of the ground, the main objects of his General's plan, and of understanding thoroughly the part his arm is playing in support of it. As things progress, he will be able to see what steps the enemy intend taking to meet these dispositions, and where the important conflicts are likely to occur. He sees before him the actual targets he will have to shoot at, and may learn how most successfully to attack them. The development of the fight shows what is taking place, and enables him to forsee certain coming situations, and so be ready to render the utmost support to his side without waiting for orders, which in many cases he will not receive. Whether his deductions, judged by the event as it takes place, are correct or not, matters little. Providing his reasoning is based on sound principles, profit of some sort will result.

Difficulties of estimating the effect of artillery at manœuvres.

For various reasons there is more difficulty in tracing the action of artillery through the course of a sham-fight, and forming a reliable estimate of the effect it would probably have produced, than either of the other arms. With infantry and cavalry we can see every move, and can form some opinion of the result; while the action of a force which remains stationary and apparently inactive is liable to have its services underrated, or for the time forgotten. Most gunners who have taken part in field-days and manœuvres must own to having often experienced, at the end of the day, a certain amount of haziness as to the precise doings of their arm, not with regard to the actual positions which the guns have occupied, but with regard to the probable effect which their guns would have produced; and it is only by a very careful examination of the reports of both sides, that an opinion of any value on this point can be formed. A great improvement in this direction has been made by the introduction of the canvas screen, which indicates the target at which the guns are for the moment firing; but the results at present reached are not on the whole, we venture to think, as satisfactory as they ought to be, and as the question is one in which we ourselves are chiefly concerned, it is for us to find a solution of the difficulty. Given the rate of fire, and the time in action, of a battery which has declared by raising its screen the target at which it is firing, the number of rounds expended at that particular target can be easily computed. Were this system pursued throughout the day, the total number of rounds estimated to have been fired in the whole course of the action, and also those at each particular target would be on record. And thus a complete account would be preserved of the doings of the battery. By working on these lines artillery would be represented in the combat by shell, instead of sabres or bayonets, at the decisive point; and it would greatly assist an umpire in arriving at a decision if he could be informed of the probable number of shell fired by the batteries instead of being told: "My batteries have been firing at that infantry for the last half-hour."

Proposed plan for recording probable work performed by guns.

Though averse to the increase of "Forms," the use of one for all batteries would probably simplify this system and lead to uniformity. A sample of one proposed for this purpose is given in the appendix. The merits claimed for an arrangement of this kind are as follows :— Forms to be used by batteries at field-days.

(1.) It would check a tendency towards too frequent changes of target.

(2.) By a comparison of the different reports an opinion could be formed as to what extent dispersion or concentration of fire had been carried out by the batteries engaged, and to what extent Brigade Divisions or larger units worked in masses.

(3.) By means of a minuter description of the target (name of regiment, first line or supports, kneeling or standing, in open or behind cover, etc.) the effect of the fire could be more accurately gauged.

(4.) It could be made to work in with that for the replenishment of ammunition, and so assist in estimating to what extent our present supply suffices.

By marking on a tracing of the 6-inch map the different positions of the batteries during the course of the action, drawing lines from each battery to its objective and marking thereon the number of rounds fired, a rapid and comprehensive summary of the day's work could be easily compiled. A comparison could thus be made of the work done by the artillery on both sides, and useful information gained. Means of forming summary of day's work on a 6-inch map.

Should a system of this kind be accepted as practical, it is held that benefit would result if an officer were deputed to complete an annual report of the progress made in this and other respects, during the summer manœuvres at Aldershot and elsewhere.

The importance of such work cannot be placed in the second rank, even with that of our shooting camp at Okehampton. Shooting being after all only one link in the chain of our efficiency. It by no means follows, that because a man is an unerring marksman he will of necessity be a successful hunter. Activity, patience, nerve, observation, study of the habits of the quarry and of the means of circumventing it, and a number of other qualifications are also necessary. As marksmen during the past ten years, we have progressed with giant strides. Can we, however, claim to have made the same amount of progress in practical artillery tactics, based on our own experience in the field? Annual report on artillery manœuvres. Marksmanship only one step towards efficiency.

The conditions under which the accidental battle takes place are so varied, and so many different factors have to be considered, that it is impossible to sketch out any general procedure for it. As before stated, the task of the Officer Commanding the artillery is much harder in this case than in either of the former ones; for, as the guns will play a most important part in the earlier stages of such encounters, much will depend upon his action, and he must come to a rapid decision, and often have to take important steps on his own responsibility. His batteries and Brigade Divisions will have to be thrown into the fight piecemeal as they come up, and the difficulties of command over them Consideration of action of artillery in the accidental battle.

as a mass will be greatly increased. Whether he is desirous of controlling the action of all his assembled guns, or is content to grant to his subordinates great freedom in acting on their own judgment according to local circumstances, a time will come when the confusion of the fight must render anything but dispersion of command impracticable, and when the struggle will have to be carried out by the initiative of Brigade Division and Battery Commanders.

Position of Officer Commanding Artillery.

In order that he may gain time, before coming into action his position will be far in advance of the main body of his guns, with whom he should be able to communicate as rapidly as possible, and here the employment of trained and selected orderlies will be of great value. As it is not possible to represent at manœuvres the many difficulties which

Necessity of preciseness and rapidity at manœuvres.

will occur on active service, much preciseness and rapidity should be demanded in the former. The use of written orders with times of receipt and despatch marked on them, being employed to test the time taken in executing and planning the various evolutions.

In the above remarks with regard to tactical exercises generally, no mention has been made of the different systems of ranging as this is not considered to be a question for tactical manœuvres, but rather one for decision on the shooting ground.

There is one point, however, which we venture to think might receive more attention at manœuvres, viz.: The more frequent exercise of Brigade Divisions in the regulation practice of firing at moving objects advancing towards the batteries.

Question of moving targets at manœuvres.

One is led to believe that this is considered the most effective manner of repelling an organised frontal attack by infantry or cavalry, and if this be a correct view of the case the numerous favourable opportunities of practising it on field-days would appear to be too valuable to be lost. If on the other hand this mode of procedure is considered to be an impracticable one in the field, its retention as an exercise appears useless. As the chief difficulty in carrying out this practice lies in the securing of an opportune rapid fire from the shrapnel sections, whenever the "over" of the ranging section has been obtained, it is hard to test the result in a satisfactory manner, without a considerable expenditure of blank ammunition, in the absence of this a liberal supply of friction tubes would form a fair substitute.

Exercise for concentrating batteries in positions indicated by sound of firing.

Lastly, of late years we have heard much on the subject of marching to the sound of the cannon, and this has suggested the idea that a useful exercise for practising our batteries might be founded on this principle, by sending out a battery, on the day appointed, to a certain place unknown to the remainder and some miles distant from them, with orders to open fire with blank ammunition at a fixed hour. The rest of the batteries, in readiness on their respective parade grounds, or placed on certain roads, having received orders that on hearing firing they were to move to support the guns in action, would have to discover the position of the engaged battery, and move to its aid.

To do this, orders would have to be issued by what roads the batteries and their ammunition columns were to move, and arrangements made for leading them into position by the most concealed approaches, and deploying them as rapidly as possible. Practice would thus be

gained in the rapid reconnaissance of a position, and in controlling the movements of a large number of batteries advancing on an objective whose position was partially unknown.

The special idea for the day would give the necessary detail regarding the position of the enemy and those of our own troops, and the general intention of the General commanding the side.

To sum up then, the following are the chief points suggested for consideration in training our artillery in masses:— Summary. Points for consideration in the training of artillery in masses.

(1.) The division of tactical exercises into two main classes:

(*a*) Those in which artillery alone take part.

(*b*) Those in which it manœuvres in company with the other arms.

(2.) That as the most important target for artillery fire is the infantry, we must study how to strike it in the most effective manner, and endeavour to check its advance by anticipating its movements.

(3.) That as no progress can be made in artillery tactics until those of the other arms have been thoroughly mastered, all tactical exercises should be framed on the supposition that we are acting with other troops, whose position should be indicated.

(4.) That by practical experiment in the field we should devise a fixed procedure to be employed whenever possible in handling a large mass of artillery, so as to avoid waste of time and insure combination of the mass. Such procedure to include the uniform framing and transmission of orders, rules with regard to the use of intrenchments, and the fire control of masses, the sub-division of command and the positions of the Group Commanders of the mass.

(5.) The establishment of a system which will enable both ourselves and the other arms to form a reliable estimate of the probable effect of artillery.

(6.) That with a view to progress in the tactical training of artillery, whenever manœuvres on a large scale take place, an official account of the proceedings be published, giving the result of the whole, and the general conclusions arrived at.

The matter contained in the preceding pages gives the result of 3 years' experience at manœuvres at Aldershot, including the camps in Berkshire and Hampshire.

Many will, no doubt, dissent from the conclusions arrived at, but all it is hoped will feel, that whatever may have been written has been brought forward with the earnest desire and honest intention of promoting the efficiency of our Regiment, by directing the thoughts of those most capable of forming a sound opinion, to some points which may be worthy of their attention.

BATTERY FIELD-DAY REPORT.

Place..... **Date**.....

Position of Battery.	Number of Series.	Time of Commencement of Series.	Time of termination of Series.	Total number of rounds in Series at 4 rounds per minute.	General target fired at.	Particular portion fired at.	Position of target.	Range in yards.	Good, fair, or indifferent view of target.
		H. M.	H. M.						
Miles Hill	1	10 30	11 2	128	Cavalry	Reserve massed in column.	Cove Plateau.	3000	Fair.
	2	11 2	11 30	112	Infantry	In column of fours on road near Reservoir.	West of Reservoir.	2400	Good.
	3	11 30	12 (noon)	120	Infantry	Shooting line (Cameronians.)	Laffan's Plain.	1600	Good.
Jubilee Hill	4	12 20	12 50	120	Infantry	Right flank of shooting line (Highland Light Infantry).	Ealmore Hill.	1800	Indifferent.
	5	12 50	1 0	40	Infantry	Centre Regiment of Right Brigade. (93rd Highlanders).	West of Centre Plain.	1100	Good.
Bricksbury Hill	6	1 30	2 0	120	Infantry	Right Battalion Reserve Brigade in column of companies.	South end of Long Valley.	2100	Good.

Proposed form for the use of Batteries at Field-days, giving a record of the work performed by each throughout the day in question.

WHAT IS THE BEST TACTICAL ORGANISATION AND SYSTEM OF TRAINING MASSED BATTERIES OF HORSE AND FIELD ARTILLERY?

BY

MAJOR A. M. MURRAY, R.A.

"RAPIDITÉ! PROMPTITUDE! AUDACE!"

SILVER MEDAL PRIZE ESSAY, 1894.

PART I.

Introductory.

"Artillery fire must be concentrated and directed by one will."[1]

The question under discussion.

THE subject chosen for this year's Essay is the natural sequel to that which was selected two years ago.[2] In 1892 the organisation, training, and system of command of the single battery was considered in application to the necessity for securing Fire Discipline within its ranks. The inquiry is now extended to the case of massed batteries. The battery of six guns is the fire unit of Horse and Field Artillery. What are the best means of utilising the fire units in order to develop their full fighting power when acting together and in combination with the other Arms of the Service? How should batteries be tactically collected and organised in the field, what should be the system of command, and how should this be exercised through the various grades of responsibility from the superior Artillery Commander down to the battery leader? These are the questions which have been proposed for the present discussion.

Its wide range.

While the title of the Essay opens up a wide range for thought, it presupposes no established agreement in regard to any tactical organisation or system of training above the battery. Writers are consequently free to examine the question apart from existing methods and with perfect latitude as regards any action hitherto taken or hereafter contemplated. Such examination must necessarily take close account of tactical systems at present in force both at home and abroad,

[1] Report on the Manœuvres in Hampshire, 1891, by Lieut.-General Sir Evelyn Wood, V.C., G.C.B., G.C.M.G.

[2] "Fire Discipline; its necessity in a battery of Horse and Field Artillery, and the best means of securing it."

but the inquiry need not be the less free for this cause, and it is reasonable to hope that the very fact of its being so free will render it more helpful to those who are interested in the study of modern artillery tactics.

Two assumptions will be made. The first assumption is that the battery is the fire unit of Artillery.

Before proceeding with the detailed discussion of the subject of the Essay, it will be necessary to make two assumptions which the experience of the past has placed beyond the limits of controversy. It will be assumed in the first place that the statement made in the opening paragraph of this paper as to the battery of six guns being the fire unit of Horse and Field Artillery is accepted as an accomplished fact.[1] Five years ago this fact was not so clearly recognised. In the "Instructions for Practice," issued in 1888, a system was laid down by means of which the Brigade Division Commander was required to carry out the executive process, known as "ranging" collectively for all the batteries under his command. This being found to be impracticable, the system was discontinued in 1889. From that date the battery has been always regarded as the fire unit, and all subsequent modifications in Fire Discipline training have been in the direction of emphasising its autonomy as such.

The question of the tactical unit will be dealt with later on.

How far the battery when acting in combination with others is also to be regarded as the tactical unit will be a matter for inquiry later on in this paper. To find a solution to this question would seem to have been one of the objects in view of the Committee in selecting the present subject for discussion. It is not, therefore, proposed to anticipate any conclusions which may be arrived at hereafter until the arguments bearing on the question have been fully examined. This part of the Essay is merely meant to serve as a preface to the other parts, and is written to introduce rather than discuss the subject which will be considered hereafter from the different points of view under which it presents itself to the mind.

The second assumption is that the primary object of the tactics of massed batteries of artillery is to secure the concentration of their fire.

The second assumption is that the primary object of the tactics of massed batteries of artillery is to ensure the simultaneous concentration of their fire on a given point, at a given time, and in obedience to the will of a single commander. This cardinal principle of modern artillery tactics was first taught by Napoleon, and subsequently used against him by the Allied Powers[2] when they had learnt the secret of his victories. "Since the time of Napoleon," wrote the author of the "Tactical Retrospect,"[3] in 1866, "the concentration of great masses

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[1] "The ranging of a battery and the conduct of its fire will be left entirely in the hands of the Battery Commander." "Field Artillery Drill," 1893.

Regarding the number of guns in a battery, Napoleon organised his batteries with eight guns, for the reason (given by himself) that this number afforded facilities for subdividing the battery. In his days guns, when once in action, were fought individually, and not collectively, by the Battery Commander. There is a consensus of agreement now as to six being the correct number of guns for a battery. A recent writer remarks as follows on this point:—"It is found as a matter of practical experience in action that with a 4-gun battery there are pauses in the fire after every four rounds. With an 8-gun battery it is generally found that there are two guns loaded and waiting for their turn to fire, consequently wasting time. With a 6-gun battery there are no pauses, and every gun is doing its full work without hurry and without waste of time." "Field Artillery Fire." By Captain W. L. White, R.A.

[2] When Napoleon saw the great artillery masses of the Allied armies at Leipzig, he cried angrily: "At last they have learnt something."

[3] "*Tacktische Rückblicke auf 1866,*" translated from the German by Col. H. A. Ouvry, C.B.

of artillery has become an axiom." It was not the denial of the principle which led to the effacement of the Prussian artillery in the war with Austria, but the faulty means which were taken to give effect to its practice.[1] British artillerymen first learnt its truth at the battle of Vittoria,[2] and the lesson was not thrown away at Waterloo.[3] It was forgotten during the long years of peace which preceded the Crimean War, with the result that the artillery only took a feeble part in the hard won victory of the Alma. The value of the Arm underwent a corresponding degree of depreciation until the successes of the German Artillery in 1870 restored it to the place it occupied under Napoleon. All modern artillery drill-books[4] now base their manœuvre formations upon the recognition of this principle, which is universally received as an axiom of artillery tactics.

Two definite issues.

By the acceptance of the foregoing assumptions, the problem which remains to be solved becomes narrowed down to two clear and definite issues. Firstly, what is the best tactical organisation for securing the maximum number of batteries being brought into action at the right time and right place? This question will be considered in Part II. of this Essay. Secondly, having fixed the organisation, what is the best system of training for utilising this organisation, not only for the tactical purpose of bringing massed batteries into the field, but in order to secure the maintenance of superior control while they are in action? This second question will be dealt with in Part III. of the Essay. The subject will then be considered generally (Part IV.) in some concluding reflections.

PART II.

Tactical Organisation.

"Field Artillery is organised by Batteries, and manœuvres by Brigade-Divisions."[5]

What is the tactical unit of Horse and Field Artillery?

The first question which suggests itself for consideration is, What is the tactical unit of Horse and Field Artillery? The answer to this question must depend upon what interpretation is placed on the ex-

[1] These faults are summarised by Prince Kraft zu Hohenlohe Ingelfingen as follows:—
(1.) Unwillingness to employ masses of artillery to prepare the action.
(2.) False plan of holding a Reserve Artillery in hand.
(3.) Guns were kept too far to the rear in the columns of route.
(4.) Slow pace of marching.—"Letters on Artillery," translated by Major N. L. Walford, R.A.

[2] The fact that the concentration of 90 British guns was due to accident rather than to design does not detract from the value of the lesson learnt.

[3] At Waterloo 18 batteries of English, German, and Hanoverian Artillery were concentrated in a space of about 3000 yards. The whole of the Reserve Artillery was brought into action before 1.30 p.m.

[4] "It is important to be able to develop a superior number of guns from the very outset, and to produce a mass effect at an early period." "Drill Regulations of the German Field Artillery," 1892, translated by Captain W. A. Macbean, R.A.
"It is essential that the artillery should be used in masses of the greatest strength available. In order to produce its full effect the fire of artillery must be concentrated." "Field Artillery Drill," 1893.

[5] "Skill-at-Arms," by Lieut.-General Sir W. J. Williams, K.C.B., R.A., "Proceedings," R.A.I., September, 1892.

pression "tactical unit." If it be sought to ascertain what is the greatest number of guns that can be led and fought by the hand and voice of one commander, then the answer points to the battery, and to the battery only, as fulfilling this condition. The executive personal command of three or even two batteries under modern tactical conditions is not within the reach of human possibility. A commander may make his voice heard throughout a Brigade Division of three batteries when halted in rendezvous formation, but as soon as the batteries deploy for manœuvre oral control ceases to be possible.

The battery of six guns is the tactical unit.

The right conception of a tactical unit seems to be that it should be able to manœuvre and fight at all times under the direct personal leadership of its commander.[1] The single battery does do this. Massed batteries do not. "A battery moves as a whole into a new position."[2] It is personally led by its commander while moving, and personally fought by him while in action. The officers and men look to their battery leader as the source of all their actions. It is his voice and his signal which they watch for and obey. What takes place between him and his superior does not enter their thoughts. They have no eyes and no ears beyond their own Commanding Officer. "The battery is the unit of artillery. All other organisation is accidental. It is by batteries that artillerymen make war."[3]

German teaching on this point.

The teaching of the German Artillery Drill Regulations is very clear on this point. While enjoining simultaneous action on the part of all the batteries of the Brigade Division, the necessity of developing the tactical initiative of each Battery Commander is strongly insisted on. In advancing into position it is laid down that "Identical procedure on the part of all the batteries is uncalled for"[4]—the main consideration to be kept uppermost in mind being the importance of taking advantage of cover. When the Brigade Division halts behind the fighting position previous to coming into action, the orders are that "each battery is to form up as its commander may direct."[5] After the Battery Commanders have been called up to receive their orders from the Brigade Division Commander as to target and ground allotted to their batteries, they are thenceforward required to act for themselves. "They settle how they will lead their batteries into action, upon the position of the first line of wagons, and upon the number of wagons to be called up to the battery."[6] Both the letter and the spirit of the above quoted regulations demand from the battery leader that he should at all times be ready to assume the functions of an executive unit commander.

Example of the Franco-German War.

The German drill-book is based on the practical experience of the campaign of 1870–71, and this fact invests it with an authority rising above other drill regulations, which are based only on theories deduced

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[1] "I know no better principle than the one I have mentioned, that the size of the units should be limited by the power of command of one man."—"Organisation of an Army for War." Lecture by Lieut.-General Sir R. Harrison, K.C.B., R.E., Aldershot Military Society, 3rd January, 1889.

[2] "Field Artillery Drill," 1893.

[3] "History of the Royal Artillery," by the late Colonel Duncan, R.A.

[4] "Drill Regulations of the German Field Artillery," 1892.

[5] *Ibid.*

[6] *Ibid.*

from peace manœuvres. A careful study of the artillery tactics in the principal battles of the Franco-German War shows that though organised in Brigade Divisions and regiments, and though the chain of responsibility was habitually preserved from the superior Artillery Commander down to the battery leader, the actual moving into position was nearly always carried out by batteries working under the independent tactical leadership of their own commander. "Throughout the war of 1870–71," wrote Prince Kraft in his now famous "Letters on Artillery," "The brigades did not advance (with the sole exception of the movement of the 2nd Field Brigade at Sedan) into their position under the individual command of the Commander of the Brigade; but one battery after another in succession, as they came up in column of route, moved up according to the orders sent to it by the Officer Commanding the Brigade."

Tactics and shooting cannot be separated. The tactical unit is identical with the fire unit.

It is necessary to dwell on this point, because there has been a recent tendency to misconstrue the spirit of German Artillery tactical teaching.[1] It cannot be too clearly understood that the organisation of the German Artillery has for its object to develop, subject to superior direction, the necessary tactical initiative of the single battery. The German Artillery regulations give no sanction to the distinction which certain writers have recently drawn between shooting and tactics.[2] The German battery is the tactical unit as well as the fire unit, and this is no arbitrary definition, but has been deduced from the practical experience of a campaign which was mainly decided by the superior organisation and training of the German Artillery. Batteries are collected in Brigade Divisions, Brigade Divisions in Regiments, and Regiments in Corps Brigades, not in order to limit their required initiative, but to utilise to the utmost their combined power when massed in battle. The system does not relieve superior officers of responsibility, but rather increases their sense of it, and enables them to exercise their control by more certain, intelligent, and effective methods than were formerly used. "A living organism has taken the place of a mechanical instrument."[3]

Tactical organisation of Artillery under Napoleon.

Accepting the battery of six guns as the first unit of organisation, how should the units be combined for tactical purposes? Napoleon was the first general to organise his artillery with the object of securing the concentration of fire of massed batteries under "one will." The normal organisation of the Imperial Guard,[4] calculated at 40,000 men, was in four Infantry Divisions and one Cavalry Division. To this force

[1] Thus, an able writer, who has recently contributed a series of instructive articles to the "Proceedings" of the Royal Artillery Institution, writes as follows somewhat regretfully of the British battery system:—"In our service the battery is still regarded by the majority of officers as the unit, in whose leader are embraced all the functions, both of command and administration. The prerogative of the Major is still jealously guarded." "Achievements of Field Artillery," by Major E. S. May, R.A.

[2] Thus, Major White, R.A. remarks as follows:—"The Brigade Division has become the tactical unit, and the battery the fighting unit." "Field Artillery Fire."
If German teaching be accepted as trustworthy, this sharp distinction seems hardly warrantable.

[3] "War," by Colonel J. F. Maurice, C.B., R.A.

[4] This organisation was subjected to various modifications according to fluctuations in the strength of the Guard. The organisation of the other corps of the Grand Army was assimilated to that of the Imperial Guard.

Napoleon allotted[1] 120 guns, organised in 15 batteries of 8 guns each. The distribution was as follows:—two batteries to each Infantry Division, four batteries to the Cavalry Division, and three batteries in Reserve. The system of command was very much as at present. There was a superior Commander for the whole of the Artillery of the Guard, and subordinate Commanders for the Divisional and Reserve Artillery. The Divisional Generals were always liable to have their guns taken from their command when Napoleon wished to produce a decisive effect.[2] Notable instances of this occurred at Wagram in 1809, and at Lützen in 1813, when all the available batteries of the Guard were massed under the command of General Druôt.

Retrospect of British Artillery tactical organisation.

In our own service during the Peninsular and Waterloo Campaigns the tactical organisation of the artillery was usually in Brigade Divisions[3] of two batteries each. At Waterloo, each of the Infantry Divisions engaged was allotted two batteries, under a Lieut.-Colonel.[4] At the battle of the Alma the 1st, 2nd, 3rd and Light Divisions received two batteries each—the 4th Division only one.[5] In Egypt, the Divisional Artillery was organised in Brigade Divisions of two batteries, each under a Lieut.-Colonel—the Corps Artillery being at first composed of four batteries (three Field and one Horse Artillery). During the advance on Tel-el-Kebir the Divisional Artillery (two Brigade Divisions of two batteries each) and the Corps Artillery (one Brigade Division of three batteries) were massed under the united command of the General Officer Commanding the Artillery of the Expeditionary Force.[6]

Tactical organisation of German Artillery in the war of 1870–71.

In the war of 1870–71 each German Army Corps had a Regiment of Artillery attached to it. This regiment was composed of twelve Field Batteries forming three Brigade Divisions, and three Horse Artillery Batteries forming one Brigade Division. Each Infantry Division received one Brigade Division of four batteries—the remainder of the artillery, after a share of the horse batteries was allotted to the cavalry, being given to the Corps Artillery. The regiments, however, varied in strength, and some Brigade Divisions contained only two and three batteries.[7]

The normal organisation of the Artillery of a German Corps at the present date is as follows:—

Normal organisation of German Artillery at the present date.

Each Corps has a Brigade of Artillery attached to it. The Brigade is divided into two regiments, the 1st Regiment contains twelve Field Batteries organised in four Brigade Divisions. The 2nd Regiment contains nine Field Batteries organised in three Brigade Divisions, and two Horse Artillery Batteries forming a 4th Brigade Division. The

[1] "*L'expérience a prouvé qu'il fallait quatre pièces pour 1000 hommes.*" *Correspondance de Napoléon 1er. Tome 31.*

[2] "*C'est l'artillerie de ma garde qui décide la plupart des batailles parceque l'ayant toujours sous la main je puis la porter partout où il est nécessaire.*"

[3] The term "Brigade Division" is used throughout this Essay to indicate the next tactical organisation of artillery above the battery.

[4] "Letters of Colonel Sir Augustus Fraser, K.C.B., R.H.A." Edited by Major-General Sabine, R.A.

[5] "The War in the Crimea." By General Sir E. Hamley, K.C.B.

[6] Official account of the expedition to Egypt, 1882. By Colonel J. F. Maurice, C.B., R.A.

[7] "Letters on Artillery." By Prince Kraft zu Hohenlohe Ingelfingen.

first two Brigade Divisions of the 1st Regiment form the artillery of the 1st Infantry Division, and the first two Brigade Divisions of the 2nd Regiment form that of the 2nd Infantry Division. The Corps Artillery is formed from the 3rd Brigade Division of each regiment, and the Horse Artillery Brigade Division of the 2nd Regiment. The 4th Brigade Division of the 1st Regiment remains behind on mobilisation to form the Artillery of the Reserve Divisions. This organisation gives 20 batteries (120 guns) to each German Corps.[1]

Normal organisation of the French Artillery at the present date.

The normal organisation of the French Artillery is more homogeneous.[2] A Brigade containing two regiments is assigned to each Corps. The 1st Regiment has 12 Field Batteries organised in four Brigade Divisions; the 2nd Regiment has nine Field Batteries (three Frigade Divisions) and a Brigade Division of three Horse Artillery Batteries. Two Brigade Divisions from the 1st Regiment are allotted to each of the Infantry Divisions. The Corps Artillery receives two Brigade Divisions (six Field Batteries) from the 2nd Regiment and two of the Horse Artillery Batteries. The 3rd Brigade Division of the 2nd Regiment is kept in reserve on mobilisation, and the 3rd Horse Artillery Battery is detached with one of the independent Cavalry Divisions. A French Corps would thus take the field with the same number of guns as a German Corps.

Normal organisation of the Artillery of an English Corps at the present date.

The normal organisation of an English Corps as at present fixed is in three Infantry Divisions, to each of which is allotted one Brigade Division of three Field Batteries. The Corps Artillery contains one Brigade Division of three Field Batteries, and one Brigade Division of two Horse Artillery Batteries. 14 batteries (84 guns) are thus brought into the field. To bring the artillery strength of an English Corps up to that of a French or German Corps it would be necessary to add two Brigade Divisions (six batteries), which, under the existing organisation, would probably be allotted to the Corps Artillery.

The Brigade Division of three batteries the next tactical organisation above the battery.

The above facts show that in the English, French, and German armies the next tactical organisation above the battery is the Brigade Division of three batteries—Horse Artillery Brigade Divisions only containing two batteries. The number three has no special tactical significance, but appears originally to have been chosen to suit the distribution of batteries between the Infantry Divisions and the Corps Artillery. The experience of peace manœuvres has since proved that the Brigade Division of three batteries is well adapted for tactical purposes.[3] Four batteries are too many for effective command, while, if only two batteries are brigaded together, there is an unnecessary multiplicity of Commanders subordinate to the superior Artillery Commander of the Corps. The Brigade Division of three batteries has now become the normal brigade unit of Field Artillery.[4] This will be the tactical

[1] Five guns per 1000 fighting men.

[2] "Hand-book of the French Army," 1891. Edited by Captain Charles á Court.

[3] In the Italian and Roumanian Artillery the Brigade Division has four batteries (each of eight guns). In Russia the tactical organisation of the artillery differs entirely from that of any other Power. There is no Corps Artillery; the whole of the batteries march with the Infantry and Cavalry Divisions—only 108 guns being brought into the field with each corps. Field Batteries have eight guns each, Horse Artillery Batteries, six.

[4] "Employment by Brigade Divisions is the rule; the isolated action of batteries is exceptional." "Drill Regulations of the German Field Artillery, 1892."

organisation adopted in future artillery fighting, and batteries should be organised and trained during peace on this understanding.

The French and German Artillery Regiments are administrative not tactical organisations.

The permanent localisation of the French and German Artillery in Regiments and Army Corps Brigades is an administrative, not a tactical organisation. The tactical cohesion of more than one Brigade Division is not considered practicable. In both armies when the corps take the field the regiments of artillery are broken up—the batteries being distributed by Brigade Divisions among the Infantry Divisions and Corps Artillery. They may, or may not, be brought together again, according to circumstances. When they are so brought together the procedure is simple, and consists in the superior Artillery Commander sending orders to each Brigade Division Commander, leaving the detailed execution of the orders to him and the battery leaders under him.[1]

Inexpediency of permanently organising British Artillery in larger units than batteries.

The permanent organisation of Brigade Division units of three Field Batteries each has been sometimes suggested for our own artillery.[2] Such an organisation, however, seems neither applicable nor expedient. The British Artillery service is one of detachment. Our small wars require small units. In India and the Colonies single batteries are constantly required where whole Brigade Divisions would not be wanted. The present administrative independence of each battery enables it to be embarked abroad at the shortest possible notice. "We have come back to the battery," wrote General Markham in 1887, "by sheer force of circumstances."[3]

Advantage accruing to superior commanders from being freed from details of executive administrative work.

Apart from the above considerations, there are obvious advantages in freeing superior Artillery Commanders from administrative details. Artillery manœuvre tactics demand the highest qualities from the Brigade Division leader. To command a Brigade Division of three batteries on a war footing with its attendant ammunition column is admittedly more difficult than to command a brigade of three infantry battalions. The necessary qualities for successful leadership can only be developed by constant practice in the field and close study indoors. Intimate practical acquaintance with the tactics of the other Arms is also necessary to a Brigade Division Commander. It seems certain that if in addition to his tactical duties he were charged with the administrative details of the executive units under his command, the burden would be more than he could bear. The Aldershot system by which batteries are temporarily organised in tactical Brigade Divisions

[1] "The battery is always, the Brigade Division only so far as is feasible, directed by commands and signals. In larger units than these, instructions and transmitted orders are substituted for the above." "Drill Regulations of the German Field Artillery," 1892.

[2] "It has often been considered a question whether it would not be desirable to adopt a system more similar to other branches of the army by combining a certain force of artillery, equal to perhaps three or more batteries under a Lieut.-Colonel, with a duly constituted staff, and to be moved about from station to station, or on service as such; but this for certain reasons would fail to work satisfactorily, as in fact was the case with the Brigade system some years ago. The reasons for this failure are due partly to the want of accommodation, but more to the constant necessity of having single batteries detached at small stations, both at home and abroad, where, for the purpose of regimental administration, they would be beyond control. Whatever the organisation may be, it must be admitted that the battery is the best for all practical and administrative purposes to be retained as the unit." Evidence given before Lord Harris's Committee. Question 4124. Major-General E. Markham, D.-A.-G., R.A.

[3] "If possible, the first tactical division should correspond with the first administrative division, or, in other words, the smallest independent tactical command should also be the smallest administrative division." "*Précis* of Tactics," by Colonel Home, C.B., R.E.

seems admirably adapted for developing the necessary initiative of the battery leader and the equally necessary control of the Brigade Division Commander.

The following would seem to be a summary of the conclusions already arrived at:— Summary of conclusions already arrived at.

(*a.*) The battery of six guns is the tactical unit of Horse and Field Artillery, meaning by that expression that it contains the largest number of guns (with their attendant ammunition wagons) which can be normally led by the hand and voice of one commander. The battery is never divided, and is commanded as a whole unit by its own leader both in and out of action.

(*b.*) The Brigade Division is the next tactical organisation above the battery, and consists normally of three batteries (Horse Artillery usually two) brigaded together under one commander. The functions of a Brigade Division Commander are those appertaining to a Brigadier. He exercises his command through the battery leaders. He directs the tactical leading of the batteries, and controls their combined fire, leaving the detailed execution of his orders to the Battery Commanders. Batteries fight in Brigade Divisions; their isolated action is exceptional.

(*c.*) The tactical organisation above the Brigade Division depends on the number of units that can be placed in the field. Superior Commanders will always direct massed batteries of artillery through their Brigade Division Commanders, leaving them and their battery leaders to execute all orders received, according to the organisation and system of command described in paragraphs (*a.*) and (*b.*) of the foregoing summary.

PART III.

System of Training.

"All evolutions which are not necessary for the object of artillery in war ought to be abolished, in order to save time, which may be employed in practising carefully and exactly all the other instructions contained in the Regulations."[1]

The system of training massed batteries depends upon the objects sought for. It will be necessary, therefore, to consider these objects at some length, and during the investigation the best system for achieving these objects will be made clear. The system of training depends on the objects sought for.

The training of the battery comes first.[2] How this should be carried out was dealt with in the four papers which were written for the Prize The first necessity is to train the battery.

[1] "Letters on Artillery," by Prince Kraft zu Hohenlohe Ingelfingen, translated from the German by Major N. L. Walford, R.A.

[2] "Training without and with guns is completed within the battery. In the Brigade Division the co-operation of several batteries for a common tactical purpose is to be practised." "Drill Regulations of the German Field Artillery," 1892.

Essay Competition in 1892.[1] The papers, each in their way, were so exhaustive of the subject that there is no necessity to return to its discussion, unless it be to urge the importance of the preliminary instruction of the battery being systematic and complete. Until it is complete no attempt should be made to mass batteries for combined tactical instruction. The task of the Brigade Division Commander is not to teach his batteries, but to teach Commanding Officers how to lead their batteries for a common tactical purpose under his direction. "Close mutual understanding between the Brigade Division Commander and battery leaders is the object to be striven for."[2]

Objects to be kept in view in training the Brigade Division.

The main purpose of Brigade Division training should be to teach only what is useful for war service. A certain amount of what is known as "precise" drill is necessary at the beginning of each season as a basis for manœuvre instruction. Battery Commanding Officers, as well as those under them, require to be trained in parade precision. There is no better discipline than that which comes from being drilled. Unless Battery Commanders are subjected to this test themselves they are apt to forget the difficulties of their subordinates, who are habitually drilled under their own direction. It must never be forgotten that drill comes before manœuvre, and that the "Grand Parade" is the "touchstone" of discipline.[3]

Precise Drill.

While the Brigade Division Commander should begin his course of training with precise drill, he must equally bear in mind its object. Drill is not an end, but a means to an end. It is the foundation of the building, not the building itself. "The object of drill," to quote the words of the German Artillery Regulations, "is the training and preparation of leaders and men for their duties in war."[4] The temptation to practice unnecessary precision at the expense of manœuvre tactics must be steadily resisted. "All petty refinements should be prohibited."[5] When time is so short, not an hour should be occupied beyond the actual needs of the case. Only simple drill movements should be attempted, but these should be correctly performed—evenly, noiselessly, rapidly.

Simple Drill.

"In war simplicity alone gives promise of success."[6] This fact was thoroughly grasped by the compilers of our own drill-book published last year. There are now only 35 movements laid down for battery drill, and only 14 for the Brigade Division. All complicated evolutions have disappeared from the Regulations. The experience of the Franco-German War showed that when employed in large masses in combination with other troops artillery must be brought into action by

[1] "Proceedings" of the R.A. Institution, August, September, October, November, 1892.

[2] "Drill Regulations of the German Field Artillery," 1892.

[3] "The Grand Parade is of very great importance for the artillery. An Arm in which one man finds it his duty in battle to sponge out a gun, another to fire it, and a third to bring up a shell, and in which in action no man ever stands in line with another, is thus too much inclined to consider the parade as a mere accessory and useless play. But the parade is the touchstone for the discipline and the obedience of the troops." "Letters on Artillery," by Prince Kraft zu Hohenlohe Ingelfingen.

[4] "Drill Regulations of the German Field Artillery," 1892.

[5] *Ibid.*

[6] *Ibid.*

the most elementary methods. "Recalling my own experiences," writes Prince Kraft,[1] "I may add that in the three campaigns of 1866, 1870, and 1871, the whole of my collected batteries never used any formation but the column of route and the advance in line."

Difference between Drill and Manœuvre.

After precise drill comes manœuvre training. The first necessity is to ensure the prompt and correct transmission of orders from the Brigade Division Commander to the battery leaders and Ammunition Column.[2] In both the French and German Artillery the system of communicating orders by means of trained messengers (*agents de liaison*) has been rendered very perfect during recent years. The Artillery Tactical Exercises, initiated by Sir Evelyn Wood at Aldershot in 1890, impressed the necessity of this point on English Artillery Officers. Until these exercises were started there had been little systematic practice in manœuvre tactics of Brigade Divisions. Great precision had been obtained in moving in close formation, deployments at a rapid pace from quarter-column, long advances of massed Brigade Divisions in line on open ground, and similar movements. Admirable as this practice was in teaching smartness, precision, and dexterity, it was, when unaccompanied by other instruction, an insufficient means of training batteries for their war functions. "*l'Artillerie n'a qu'une tactique—le feu.*"[3] It was only when Brigade Divisions were exercised as opposing forces or against a marked enemy with a "concrete tactical situation" in mind that the difference between drill and manœuvre as applied to artillery fighting became thoroughly understood. It was then discovered that the application of those evolutions, which had been taught on open ground in normal artillery positions, were impracticable in the broken and intersected country selected by Sir Evelyn Wood for his artillery manœuvres. A Brigade Division could not be led "simultaneously and squarely" into the fighting position with its three batteries dressed precisely in line. After some useful failures, Commanding Officers had to fall back on the methods inculcated by Prince Kraft zu Hohenlohe Ingelfingen, who lays it down as a general maxim derived from his own long experience of artillery fighting, that "a brigade can be commanded in war only by means of instructions or orders to individual batteries, and under no circumstances by the actual word of command from the Officer Commanding."[4]

Agents de Liaison.

The adoption of this system of command necessitates the Brigade Division Commander being provided with adequate means for carrying it out. It has been suggested that for this purpose there should be a permanent establishment of non-commissioned officers and orderlies (including a Sergeant-Major and a Quarter-Master-Sergeant) on the Head-Quarter Staff of each Brigade Division. This seems unnecessary. Each battery being self-dependent in regard to administration and instruction, and this being a cardinal principle of modern artillery organisa-

[1] "Letters on Artillery."

[2] "Before going into action he will communicate with his Ammunition Column, and arrange the point at which it will be found during the combat." "Field Artillery Drill," 1893.

[3] De Heusch.

[4] "Letters on Artillery," p. 377. Further on he writes: "Much as I wish that artillery should be assimilated to the other arms, I yet consider it very undesirable that it should waste its time in practising evolutions which have nothing to do with its special duty as artillery," p. 379.

tion, the duties of the permanent staff of the Brigade Division would be confined to such parades as take place when the tactical work of the Brigade Division begins. During the greater part of the year, while the battery training was going on, and always off parade, the staff would be idle. In neither the French "*groupe*" nor the German "*abtheilung*" does such a staff exist. The Commander has a permanent Adjutant and a Trumpeter, and obtains his orderlies (*agents de liaison*) from the batteries—each battery furnishing him with one or two men specially trained for the purpose. This system is found to work well. Beyond giving the English Brigade Division Commander an Adjutant outside the battery *cadres* and a trumpeter, no permanent increase of establishment seems necessary or desirable. Our own Regulations[1] direct that one set of range-finders should be kept apart as messengers, but it must be borne in mind that these may not always be available at the moment required. The system under which each battery finds its own *agents de liaison* and sends them to join the staff of the Brigade Division when required seems satisfactory. It is important to draw attention to this question, leaving the details to be a matter of arrangement between the Brigade Division and battery leaders. Both giving and transmitting orders require great practice on the part of those concerned. A Brigade Division Commander rarely has time to send written messages in battle.

Manœuvre Tactics of massed batteries—two normal methods of procedure.

After the necessary exercise in precise drill, and after arranging an organised system of communicating orders to the units, the Brigade Division Commander begins his instruction in manœuvre tactics. The main object of this instruction is to train batteries to take up positions for action by the two recognised methods, known as the "deliberate" and the "direct." Both methods have their separate use, and both require to be equally practised.

"Deliberate" method.

The "deliberate" method is adopted when there is a "preparatory position" available within reach of the fighting position, when the advance to it is covered, and when it is desired to surprise the enemy by the simultaneous opening of fire from massed batteries. When the enemy's batteries are already deployed, this method would be the only one giving any reasonable chance of success. The functions of the Artillery, Brigade Division, and Battery Commanders are in this case clearly defined. The position is reconnoitred by all of them in regular sequence. The Artillery Commander chooses the position, calls up the Brigade Division Commanders, assigns to each a section of the ground, and gives them general instructions. The Brigade Division Commander calls up the Battery Commanders, divides his share of the ground allotted to him between the batteries, indicates the target, and gives such general instructions as are necessary in regard to the advance into action, the position of the wagons, and other matters. The Battery Commanders satisfy themselves that they know the target, that it can be seen from all the guns of their batteries, and choose the ranging point. They then bring their batteries into action. It is to be noted, as a matter of comparison and not of criticism, that while the English

[1] "Field Artillery Drill," 1892, p. 209.

Regulations[1] prescribe the exact detail for the Battery Commander to follow, even down to the precise signals he should use, the German Regulations[2] leave him free to act "according to circumstances," but, at the same time, hold him "responsible that his battery comes into action in a correct and judicious manner."[3]

"Direct" method.

The "direct" method is employed when cover is not available, or surprise unnecessary or not possible. It would be generally used when the deployment of the enemy's batteries was incomplete, and in advancing after the artillery duel to take up fresh positions in support of the infantry attack. It consists in moving straight into action without any previous halt in a screened position. The advance is continuous, but is preceded, as in the "deliberate" method, by a reconnaissance of the Artillery, Brigade Division, and Battery Commanders. The English Regulations again prescribe in detail the procedure to be followed,[4] the French and German Regulations again leaving it to the discretion of those concerned.

Necessity for rapidity when adopting the "deliberate" method.

When adopting the "deliberate" method of advancing into action, time is a factor of exceeding importance. The tendency to lengthen out the process of reconnoitring and making dispositions for the occupation of the position must specially be checked. The French and German Regulations[5] lay great stress on this point, and every endeavour has been made during recent peace manœuvres to impress on artillery officers the necessity for getting guns into action with all possible celerity. In our own service, improvement is observed every year in this respect. During 1893 the average time taken in a large number of series, from the halt under cover to the first gun, was 3 mins. 36 secs. The necessity for reducing this to a minimum, consistent with effective reconnoitring, cannot be too strongly insisted on by Brigade Division Commanders.[6]

Necessity for reconnoitring when adopting the "direct" method.

In the "deliberate" system the tendency is to dawdle, in the "direct" system to hurry. Reconnoitring is, however, as essential in the latter case as in the former. Unless the Brigade Division and Battery Commanders go well ahead of the batteries,[7] the result is hesitation, confusion, and delay when the guns reach the fighting position. To take a Brigade Division of three batteries direct into action by this method is the most difficult of all tactical operations, and requires a

[1] "Field Artillery Drill," 1893, p. 86.

[2] "Drill Regulations of the German Field Artillery," 1892, p. 133. The French Regulations allow equal latitude to the Battery Commander. An account of the French method is given in a paper, entitled "Handling of Masses of Artillery," which was read by Major E. S. May, R.A., at the Royal United Service Institution in May 1893, and reported in the "Journal" for September 1893.

[3] "Drill Regulations of the German Field Artillery," 1892.

[4] The instructions are very minute, and actually specify the number of yards by which the Battery Commander should precede his battery. "Field Artillery Drill," 1893, p. 103.

[5] "The dispositions for the occupation of the position must be made so rapidly as to avoid any unnecessary delay in opening fire." "Drill Regulations of the German Field Artillery, 1892."

[6] "Rapidity is of as much importance as thoroughness in carrying out these duties." "Okehampton Experiences," 1893, by Major A. J. Hughes, R.A. "Proceedings" R.A.I., January 1894.

[7] "It seems to me the more the Majors can be encouraged to do this the better. There is no doubt of the advantage of the time gained by their being well ahead." Remarks by Colonel J. F. Maurice, C.B., R.A., during the discussion in the R.A. Institution on the 12th October, 1893.

high degree of training from the Commander downwards. It is for this reason an excellent exercise in quick leading and ready following. The incomparable mobile power of British batteries gives them for this purpose an initial advantage over the artillery of other European Powers, and every effort should be made to encourage, develop, and utilise this power to the utmost. The necessary requisites of superiority are to be found in the words which have been found for the motto of this Essay, and which were dictated by Napoleon as one of his tactical maxims: "*Rapidité! Promptitude! Audace!*" [1]

General applicability of these two normal methods of moving into action to all cases.

All movements of massed batteries for the occupation of a position resolve themselves into variations of the two normal methods described above. Whether in attack, or defence, in pursuit or retreat, the same general procedure will be used modified as regards details according to the local circumtsances of the moment. The object of peace training is to teach artillery leaders when to use one method, when the other, and what particular manœuvre formations are best applicable to each case.

System of command of massed batteries in action.

When massed batteries are in action the same gradation of responsibility is maintained as when they are moving into position. There is a consensus of agreement among the compilers of all Artillery Drill Regulations in regard to the requisite procedure. The commander of the troops determines the general target, the Artillery Commander distributes or concentrates the fire of Brigade Divisions, the Brigade Division Commander that of the batteries. [2] The application of fire depends on circumstances. Fire tactics like manœuvre tactics cannot be dictated by preconcerted laws. There are times when "gun for gun" fire may be necessary, or on the other hand when the fire of one or more batteries, or even of one or more Brigade Divisions should be combined against successive portions of the enemy's line of guns There are equally times when the enemy's artillery ceases to be the target, and when fire should be directed against troops of other arms. It was well put by a late distinguished member of this Institution that "artillery should fire at whatever arm of the enemy is most dangerous at the time." [3] The German drill-book [4] is particularly clear on this matter, and our own regulations have now placed the question beyond the limits of controversy. [5] The important point to note for the purposes of this Essay is the necessity for the system of training being so flexible, and the combined Fire Discipline of massed batteries so perfect, that the "will" of the commander may make itself decisively felt in the shortest possible space of time.

Time and Sequence of training.

Having ascertained the objects to be sought for in training massed batteries of Horse and Field Artillery, the question of time and sequence

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[1] *Correspondance de Napoléon 1er. Tome 31.*

[2] "The tactical concentration or distribution of fire is obtained by the Brigade Division Commander apportioning a greater or less extent of target to the various batteries." "Field Artillery Drill," 1893.

[3] "The use and abuse of Field Artillery," by Colonel C. B. Brackenbury, R.A. Aldershot Military Society, 11th June, 1888.

[4] "As an invariable rule the objective to be combated, regardless of loss, is that which exercises decisive influence upon the specific tactical situation." "Drill Regulations of the German Field Artillery," 1892.

[5] *Vide* instructions for "Concentration and Distribution of Fire." "Field Artillery Drill," 1893, p. 99.

of instruction must now be referred to. The varied conditions under which batteries of artillery are serving during peace in all quarters of the Empire make it impossible to lay down a general system of training which can be applicable to all cases. Aldershot, however, may be taken as the normal school of tactical instruction, the system which is now in process of development there being applied as far as possible in other places. The winter months are given up to individual battery instruction, theoretical study, and preparation for the practical out-door training. At the beginning of the drill season each battery in turn is placed at the disposal of its Commanding Officer, for a course of instruction lasting 14 days.[1] When all the batteries of the Brigade Division have completed this course they are trained as a whole brigade unit, under the Lieut.-Colonel, for a further period of a fortnight.[2] If this training is carefully thought out beforehand, and the most made of the time available, it is long enough for all necessary purposes. The Brigade Division then goes to the practice ground, where the training of the batteries, both individually and collectively, is tested under service conditions. After return from practice, or possibly before it, according to the dates fixed, the work of the Brigade Division Commander should be tested by the Artillery Commander—one or more Brigade Divisions being practised together against a marked enemy, and at other times manœuvring as opposing forces. Practice in this higher regimental training of massed batteries is essential before combined manœuvres of all arms are attempted. The value of these tactical exercises, however, depends on the care with which the schemes are worked out by those who are charged with setting them, upon the umpire's knowledge of the ground selected, and upon the merits of his subsequent criticism.[3]

Essential features of the above system of training.

The above arrangements ensure a gradually progressive system of training being carried on throughout the year, beginning with the individual battery, continued with the Brigade Division, and subsequently when feasible with massed Brigade Divisions, and so working up to the crowning test of combined manœuvres of all arms. The essential features of this system are method, regularity and patience—each leader being given full opportunity for training those under his command by his own methods, and then being subjected in his turn to being trained himself by the next superior leader above him. The problem always to be solved is how to delegate executive responsibility, and at the same time maintain the necessary control of the single will. This is a car-

[1] "Field Artillery Drill," p. 284.

[2] *Ibid*, p. 286.

[3] The writer has before him some remarks made by General Sir Evelyn Wood, V.C., G.C.B., G.C.M.G., during the conference after one of his artillery tactical days in 1891. The remarks are so pertinent to the views put forward in the above paragraph that he ventures to reproduce them here.

"I fear," said Sir Evelyn Wood, "from the mistakes made to-day that some officers have not read the criticism of last Monday's tactical exercise. I beg Commanding Officers will in future make certain that the printed critique of each day's work is circulated among all their officers. The main value of work out of doors is derived from a subsequent study of the mistakes which we are all liable to make in the field. I can assure gentlemen, whom I am now addressing, that neither my staff nor myself spare any pains to make these days instructive by previous study of the ground. I may tell you that I have been three times over the ground on which we are now assembled with the particular operation of to-day in view, and I expect to sit up till an early hour to-morrow morning compiling my critical remarks of the day's proceedings."

dinal principle, not only of artillery, but of all tactical training, and according as its truth is accepted and acted on will progress be made in preparation for war service, which is the final test of all peace instruction.

PART IV.

Conclusion.

"*On ne peut et on ne doit prescrire rien d'absolu.*"[1]

Leadership, the chief factor in Artillery fighting.

No attempt has been made in the foregoing remarks to lay down definite rules for definite circumstances. The object of the essay, as limited by its title, has been to discover general principles, both of organisation and training—the exact methods of applying those principles being left to the individuals concerned. In artillery, more than in cavalry and infantry fighting, the last word must always depend on the leaders. Mistakes are less easily remedied, and more often irrevocable. Lost opportunities rarely recur.[2] The best tactical organisation, and the most perfect system of training will not ensure success if the nerve or judgment of the leader fails at the moment of trial. Quick perception, a practised eye for country, bold horsemanship, a cool brain, ready initiative—these are moral and physical qualities which no knowledge of drill regulations will teach, unless the instincts of leadership have been developed by a high degree of cultivation. It is only by training officers from their early days to the habitual exercise of responsibility and command, that they will succeed in qualifying themselves for their future *rôle* of superior artillery leaders.

Characteristics of the German Artillery Drill Regulations.

In reading the German "Artillery Drill Regulations" it is impossible not to be struck with their breadth of view and strength of grasp of modern tactical truths. The more they are studied the more do they impress themselves on the mind as correctly interpreting the practical lessons of the last great war in Europe. It is for this reason they have been largely referred to for the purposes of this essay. So far from blinding the eyes of German Artillery Officers to the necessity for improvement, their successes in 1870 have only stimulated them to fresh exertions. The drill-book of 1892, with its preface by the German Emperor, may be truly called the "model and mirror" of a perfect code of artillery tactics. The key-note of its teaching is the inculcation of trust and confidence in subordinate leaders, and this is impressed as a second nature on every German Artillery Officer. Instead of seeking to bind officers down by fixed rules of conduct, the Regulations are framed throughout to remind them of the necessity at all times of using their judgment according to the circumstances in which they are placed. The German Emperor specially dwells on this in introducing the Regulations to the army, and warns superior commanders against crippling

[1] "*Correspondance de Napoléon 1er.*" *Tome 31.*

[2] "*Il faut profiter de toutes les occasions, car la Fortune est femme. Si vous la manquez aujourd hui ne vous attendez pas à la retrouver demain.*" "*Correspondance de Napoléon 1er.*" *Tome 31.*

that discretion which he requires all officers to exercise in preparing their men for war.[1]

The English Artillery Drill Regulations—Concluding reflections.

In the English Artillery the acceptance of these principles has been more tardy but quite as sure. If there has been no great war to teach the lessons which our French and German comrades have had so much cause to learn, the watchful spirit of interest displayed since 1870 in this country has none the less been fruitful of results. Our own Drill Regulations issued in 1893 show a just appreciation of the altered conditions of modern artillery fighting. The book is no longer loaded with a mass of detailed instructions, but is marked by a simplicity which is in striking contrast with previous editions of the same work. Based on the experience of our neighbours, and embodying all the latest ideas of tactical progress, the new Regulations still retain many of the marked and traditional characteristics of the British Artillery service. It only remains to apply those Regulations by constant practice and untiring study, remembering always that war knows no law, that it is impossible to lay down fixed rules in the presence of an enemy, and that in the words of the greatest of all masters of artillery tactics, "*On ne peut et on ne doit prescrire rien d'absolu.*"

[1] "The advantage which has been gained by the simplification of many forms is not to be nullified by the addition by any person of any verbal or written supplement to these Regulations, whether with the object of attaining increased superficial uniformity or with any other object. On the contrary, the latitude in instruction and application which has purposely been left is in no case to be materially restricted." Stettin, June 27, 1892. William.

WHAT IS THE BEST TACTICAL ORGANISATION AND SYSTEM OF TRAINING MASSED BATTERIES OF HORSE AND FIELD ARTILLERY?

BY

MAJOR E. S. MAY, R.A.

"MENS AGITAT MOLEM."

COMMENDED ESSAY, 1894.

SECTION I.

Introductory.

"In military matters two and two do not make four, unless they are brought together in concerted action."[1]

The question which forms the title for this Essay is for Artillery, that of the hour. Range and mobility are the chief characteristics of modern guns, and it is precisely these two endowments that enable them to be employed in masses. Union is strength; combination gives force its opportunity, and the history of Field Artillery is but a demonstration of these truths. The splendid results obtained by the eighteen guns that crowned the Janusberg, at Rossbach, were not lost sight of by the soldiers of Frederick's time, and Kunersdorf, Hochkirch, Torgau, not to multiply instances, all yield illustration of how guns, emancipated from the battalions, might with success be directed by one will, to the attainment of some great end.

But batteries in the last century moved at best but slowly, and were in little favour with generals accustomed to see battles won by squadrons. Their organisation, too, was but primitive, no definite regulations were in existence, and only a few instructions, which even in those early days however, be it noted, inculcated the value of a concentration against the point to be assaulted, and of uniformity of direction.[2]

But at a time when guns were endowed with only limited range and mobility they had often to be contented with such positions as were left them between the infantry, and had to take their stand, not where they might effect most, but where they would interfere least with their comrades.

Napoleon, when he set himself to develop the efficiency of his artillery, had first to overcome the difficulties with which a defective organisation hampered them. Two men of exceptional ability, Senarmont and Druôt, seconded his efforts, and a mass of guns giving the

[1] "The influence of Sea-power on the French Revolution and Empire, 1793–1812." By Captain A. T. Mahan, U.S. Navy.

[2] *Vide* translation from "*Neue Militarische Blätter*," in the "Proceedings" of the R.A. Institution for September, 1888.

decisive blow of the day became a marked characteristic of his later battle-fields. Other nations followed the lead of the great master till, at Leipzig, the long line of the Allied guns made him angrily exclaim: "At last they have learnt something." [1]

But, well appreciated though the power of a mass of guns might be, the inferiority of the *matériel* in use still prevented them from concentrating their fire without a change of position, and consequently, when a great effect was desired, a mass of batteries had to be brought up to the decisive point. In order that this mass might be ready to respond quickly to the call for it, it had to be held in reserve till the supreme moment arrived.

Thus, while Napoleon was particularly careful to keep his artillery in close association with the other arms, he was obliged to utilise as a reserve the guns of the corps (usually that of the Guard [2]) not engaged.

The American War of Secession showed that the secret of Napoleon's success with artillery had not been lost sight of on the other side of the Atlantic. Malvern Hill and Gettysburg are as conspicuous artillery battles as Friedland or Wagram, and Hunt and Alexander are names as worthy of remembrance by gunners as are Senarmont and Druôt.

Coming down to 1866, we find the Prussians keenly alive to the lessons of the earlier wars, but following still, in spite of the experiences of 1859, the methods which showed Napoleon at Leipzig that "they had learnt something." To benefit by teaching, you must be ready to modify lessons as circumstances alter, and apply knowledge to the situation of the moment. The invention of rifling had enabled guns to be utilised from the very beginning of an engagement, and the Austrians brought the bulk of theirs to bear from the first. The Prussians hesitated to avail themselves completely of the consequences which had followed the advance of science, and while they massed their guns, held them uselessly in hand.

The fact that a mobile and far-ranging artillery is practically a new arm, had not indeed been realised. Mobility allowed guns to be combined together, and at favourable opportunities, even when their range was short, that quality was sufficient to permit them to intervene decisively in the fight. Now, however, when great range and accuracy have been added to mobility, it is possible to concentrate guns together *always*, and they can change their target without altering their position. And it must not be forgotten that, to thoroughly develop the advantages of concentration, a certain fixity of position is required, and that ground once taken up must not be lightly abandoned.

Use in masses is, in fact, the logical sequence to mobility and range.[3]

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[1] "Précis of Modern Tactics." (Pratt and Home.) p. 88.
How swiftly, decisively, even impatiently Napoleon turned guns to account is very strikingly illustrated in the account of his passage of the Elbe, in May, 1813:—"No sooner did Napoleon see the preparations of the enemy than he called out, in a voice of thunder, to General Druôt: 'A hundred pieces of cannon!' and posted himself at a short distance in the rear, to direct their disposition. The Artillery of the Guard quickly came up at the gallop."—Alison, Vol. XVI., p. 226.

[2] "*C'est l'artillerie de ma garde qui decide la plupart des battailles, parce que l'ayant toujours sur la main, Je puis la porter partout où il est necessaire.*"—*Napoleon.*

[3] "*L'Artillerie de campagne en liason avec les autres armes.*" Langlois. Vol. I., p. 382.

Thus all the circumstances of the present day favour such an employment of guns, and the moment for the consideration of how best they may be trained to that end is ripe.

A more imperious necessity, however, than either convenience or propriety, forces the question on us.

There is a distinct tendency amongst all the Continental Powers to increase the proportion of artillery which accompanies their armies. Guns which might be firing cannot be kept idly in rear, and consequently a vast number of pieces have to be arrayed side by side on a modern battle-field; and they occupy so vast a space that concentration in masses is no longer a matter of choice.[1]

Even in 1870, when the proportion of guns with the German armies was smaller than it is at present,[2] the tendency to push all the guns into the first line from the outset, rendered it by no means easy for their batteries to find positions.

In the first battles of Spicheren and Woerth the German batteries occupied a space equal to one-third of the whole front of attack. At Colombey and Rezonville the fraction was slightly larger, while at Gravelotte they extended over two-fifths of the German line.[3] Indeed, were it not that science has again stepped in to aid us, the problem of how to derive full advantage from a numerous artillery, would present a most formidable difficulty.

Smokeless powder, however, will enable guns, not only to be massed, but to be posted in tiers, and such an application of them has already become a familiar feature of foreign manœuvres. Thus placed, their control by one hand becomes more than ever imperative, and the latest developments of tactics, therefore, go to fortify the arguments already used in favour of such a method of employing them.

Before, however, we enter on questions of organisation or training, it will be well to make what is meant by the term "masses of artillery" quite clear, and indicate the objects for which they are usually called together.

The Austrian Artillery Regulations of 1866 are the first which [4] have ventured on a definition, and given official recognition to the objects with which they might be formed. According to them: "Several divisions of batteries, separated or united, led by one leader, and directed against the same target, constitute a mass of artillery." This definition is, however, somewhat unsatisfactory at the present time, because, in the first place, it has become generally recognised that unity of direction and concentration of fire is only to be obtained by concentrating

[1] How much circumstances have altered since the time when some officers, now serving, joined the service, is exemplified by a reference to the "Aide Memoire to the Military Sciences" of 1846, which puts the proportion of two pieces of ordnance for every thousand infantry as the best for us, "considering how much the perfection of the infantry force diminishes the quantity of artillery necessary to an army." In our army that proportion is now 3-5, while abroad it is, in the French and German armies, 5, and there is a tendency for it to grow still larger.

See also "*Die Entwickelung der Feld Artillerie, etc.,*" by Lieut.-General Müller. Berlin, 1893. Vol. II., p. 293. He, however, puts the strength of the infantry, in a German and French Corps, somewhat higher than other authorities.

[2] In 1870 it was 3-7 per 1000 infantry; it is now 5.

[3] "Field Artillery," by Lieut.-Colonel Sisson Pratt.

[4] Langlois.

guns; and secondly, because it would seem to imply that masses of guns must concentrate their fire always on one and the same target. Unless this latter dictum be intended in its broadest sense, it cannot be entirely accepted, and it is open to misconstruction. Masses of guns, it may be assumed, will at certain stages of the fight, bring their fire to converge on an objective which might correctly be described as one target, but often that objective will only be relatively small, and a concentration on any one portion of it restricted enough to be regarded as what we are accustomed to speak of as a target would be an error. For example, a mass of guns might be formed to enable a village to be carried. Some of the batteries would fire on its borders, and the space to be cannonaded would be distributed amongst them; others would assail the principal buildings, others watch the hostile guns and prevent, if possible, their deployment; while the majority, we may assume, would bring a heavy and converging fire to bear upon that portion which had been specially selected for assault. The mass here is directed on the same objective, and yet upon one that offers several targets. It will be better to avoid pedantic niceties and to state generally, that *a mass of artillery means the concentration of a greater number of pieces than are contained in the tactical units of the day for the attainment of some definite end.*

The tactical unit, we must remember, varies with the improvements which have been effected in the arm. Formerly, the battery was thus regarded;[1] now, and for some years, in all armies, the Brigade Division has taken its place, while the battery is left as the technical or fire unit. In Continental armies, moreover, a tendency to accept a still larger tactical unit is noticeable, due to the growth in importance of Field Artillery, but for our purpose the definition we have given will fully suffice.

And now, with reference to the objects with which such masses have already usually been formed. They have been used:—

To crush the enemy's resistance and force a way for the columns of attack (Wagram, Waterloo, Gettysburg).

To make or repel a flank attack (Rossbach, Bautzen, Manassas, the employment of von Wittich's guns, in the evening, at Loigny-Poupry, and those of the French Guard, during the morning, at Wagram).

To cover the issue from a defile, or the passage of a river (Hanau, Fredericksburg, where Burnside brought 147 guns to bear.)[2]

To fill a gap in a weak or shaken line (Wagram, Beaugency, Noisseville).

To enable a beaten army to retreat (Königgratz).

But the advances in artillery science have given the arm such independence that during the Franco-German war it dared more greatly, and it is not unreasonable to assume that we may see it again aspiring

[1] Even in 1892 the writer of the "Duncan" Gold Medal Prize Essay wrote: "The battery of six guns is the unit for Horse and Field Artillery," Vol. XIX., p. 490, "Proceedings" R.A.I. It was then and is now the *fire* but not the *tactical* unit.

See also the paragraph from Duncan's "History of the Regiment," quoted on the same page.

[2] 147 guns were employed, which fired 7356 rounds of ammunition, and according to an eye-witness, "100 guns per minute were frequently discharged." "Life of General R. E. Lee," by John Cook, p. 176.

to deeds equally bold. Thus: An artillery mass surprised the enemy at Beaumont. One was driven like a wedge into the hostile line, in the case of the Hessian batteries at Gravelotte.[1] One was built up to form a solid advanced line, in attack, to hold the foe (Vionville), and on the defensive to harass his advance guard, and force his artillery to deploy (the artillery of the Austrian 10th Corps at Königgratz).

Lastly, but oftenest perhaps of all, masses of guns may be deployed (as in many of the great battles of 1870, and at Gross Beeren), to silence and beat down the enemy's batteries.

Having thus reviewed what combinations of guns have done in the past, and shown that they, by reason of their greater perfection, are now always and everywhere disposable, and that the tendency, as manufacture progresses, is to take advantage of their powers in a more extended fashion, we may turn to the question of how such a mass is best organised.

SECTION II.

Organisation.

"War is the triumph of force, of force skilfully prepared and organised."—*Vial.*[2]

A mass of guns must be formed according to the circumstances of the moment. The leader of the troops in general would indicate the moment for its formation, and decide as to its composition. To do this he should understand artillery so thoroughly as not only to be able to recognise the opportunity, but the configuration of the ground, which will render his scheme feasible.[3] He will sometimes himself give the impulse to the guns, as did Napoleon to the batteries of the Guard at Wagram, and as did the German leaders on more than one occasion in 1870. Or he will delegate the duty to some high artillery leader as in the case of Lauriston during the last phases of Wagram. Oftenest must the commanders of army units act decisively for themselves, as Longstreet did at Manassas, Blucher at Bautzen, or von Wittich at Loigny-Poupry.[4] Occasionally the initiative will come from the artillery leader himself as in the case of Druôt at Hanau, or Senarmont at Friedland.

The Officer Commanding the Artillery would usually lead the guns himself. Whoever he be, however, who takes command of such mass, he should seek, both in the occupation of positions and during subsequent movements, to facilitate the return of the various units which compose it, to the orders of the commanders of the body of troops from which they were originally taken.

In our service there is no connecting link in the hierarchy of command between the Officer Commanding Royal Artillery of a corps

[1] Quoted by Langlois in "*L'Artillerie de campagne.*"

[2] "*Cours D'art et D'histoire Militaire,*" quoted by Colonel Home in his "*Précis* of Modern Tactics."

[3] "Artillery is the arm which produces the great effect proper to it, only when directed on the main issue." Colonel Wille, in an article on "Manœuvres, etc.," translated by Lieut.-General W. H. Goodenough, C.B., R.A., "Journal of the United Service Institution," Vol. XXXVIII.

[4] "*Kriegsgeschischtliche Einzelschriften,*" Vol. VII.

and the Commanders of Brigade Divisions.[1] The Corps Artillery, however, being composed of two Brigade Divisions (Horse and Field) has an officer at its head who would, from his status, naturally supply a leader for a mass not sufficiently large to absorb all the attention of the Artillery General. Where a very large mass was formed, such as has during Continental wars and manœuvres been composed of the Artillery of two Corps d'Armée, a special leader would be designated. It is to be noted that Continental organisations by which there are only two divisions in a Corps d'Armée, and in which the Divisional Artilleries are represented by two regiments of six batteries, or two Brigade Divisions, greatly facilitates the employment of artillery in the manner under discussion. The Officer Commanding the artillery of a division has a special staff, and is of a rank superior to those leading Brigade Divisions. So is it also with the Corps Artillery. There are already, therefore, three small masses, with a leader and staff complete, in every Corps d'Armée, and they form the nucleus for the formation of still larger masses.

Our organisation with its three isolated Brigade Divisions, and a comparatively weak Corps Artillery, does not favour the proper application of guns, and from the artillery point of view is to be deprecated. It is not part of our task, however, to discuss the proper distribution or organisation of artillery with a Corps d'Armée, although we can scarcely avoid probing the subject sufficiently to ascertain the principles that provide foundations to success. It is, however, legitimate to point out that Brigade Division and Corps Artillery Commanders with us should be provided with a staff more adequate to their requirements than they already possess. Each now, has to look to his battery establishments for his staff in the field, beyond the Adjutant.[2]

Foreign leaders of Divisional Artillery are far more liberally supplied in this respect, and experience has shown, not unnecessarily so. The correct direction of even three batteries in action requires a well-matured system of sending messages and orders. Where masses are concerned, the demand for such aid becomes far more urgent, and it is no exaggeration to say that it is indispensable. In the French service messages and orders are carried by "*Agents de liaison*," specially trained for the purpose, and the experiences of the practice of masses, which are annually carried out at Chalons, have called them into existence.[3]

In Germany we find the education of "*Meldereiter*," with a view to their intelligent appreciation of the messages they carry, also insisted on.[4] We may fairly assume, therefore,[5] that in England a few orderlies specially trained for the purpose, should form a recognised portion of the staff of the Divisional Artillery. Even in peace time, a trumpeter might with advantage be added to it, and also a Sergeant-Major. The

[1] *Vide* "Field Army Establishments." The Lieut.-Colonel with Corps Field Artillery has charge of Corps Ammunition Reserves, in addition to his two batteries.

[2] *Vide* "Field Army Establishments." A Brigade Sergeant-Major is spoken of in the drill-book, but he does not really exist.

[3] *Vide* the account given of the manœuvres at Chalons, by Lieut.-Colonel Cohadon, in the "*Revue d'Artillerie*," for November, 1892.

[4] *Vide* "German Field Artillery Regulations," 1892, pp. 261–2.

[5] Some recent articles in the "Russian Artillery Journal," show that in the Russian army, also, the same demand for these orderlies has been put forward,

Corps Artillery leader should have a similar staff at his disposal. We should then possess the germs from which an efficient mass of guns might be expected to spring. This addition to our artillery organisation is believed to be a very modest one, and is kept as low as possible in order that it may have a chance of being accepted.

Further, it may be added, that the necessity for special scouts for the minor battle units is being everywhere felt, in consequence of the introduction of smokeless powder and the difficulties in discovering the proximity of an enemy thus engendered. Good scouting demands special training, and it is not enough to rely on the services of a man picked up casually because he is not otherwise employed. Moreover, each arm has its own peculiar requirements and weaknesses, and these should be thoroughly appreciated by those who look after its safety.[1]

Even a battery should, in regard to the increased independence with which guns have lately become endowed, and are rightly expected to display, be sufficient in itself to all the exigencies of war, and the new German Artillery Regulations have prescribed that batteries, especially those on the flanks, must not rely for security against surprise on the other arms alone.[2] Even in the French artillery, where establishments are on a particularly liberal scale, both as regards men and horses, it has been recommended by Colonel Langlois, that four men and four horses should be provided and trained for this special service on mobilisation, to be represented by half that number in time of peace.[3] It is therefore suggested that some such increment will be necessary in our service and will materially facilitate the judicious handling of large artillery bodies. The lessons of recent artillery tactical days at Aldershot, especially when cordite has been used, point strongly to a similar conclusion, and reinforce the arguments already adduced.

The two specific recommendations thus put forward appear the only innovations absolutely necessary in the organisation of our existing artillery units, but it will not be superfluous to say something generally with regard to organisation in relation to the combined handling of batteries, for deficiencies here have been always the greatest obstacle to their consistent employment in the manner we are dealing with. Frederick, and also Napoleon, experienced and remedied such defects, and brilliant as have been the achievements of our smaller units, and unsurpassed as they have ever been, both as regards *personnel* and *matériel*, few combined efforts of artillery have distinguished our military history, owing largely to the fact that until recently artillery has with us been regarded as "a service of detachments," and that the battery has been viewed as the be all and end all of efficiency.

Precisely the same defects in organisation had to be overcome in America before the arm could assert its real value. When the War of Secession broke out, the batteries of the Union were at first attached to

[1] *Vide* opinions expressed in "*Berittene Infanterie Patrouillen eine consequenz des heutigen Kampfes*," by Major Karl Regenspursky. Published in Vienna, 1890.
"*L'Artillerie de compagne en liaison avec les autres armes*," Vol. II., p. 358.
"*L'Artillerie est donc l'arme qui a le plus besoin d'etre eclairée.*" *Ibid*, Vol. II., p. 259.

[2] Para. 271.
"It is the duty also of Group Commanders to reconnoitre the ground in front of the position." "The Tactics of Field Artillery," by von Schell, p. 92.

[3] "*L'education de ce personnel se ferait de la maniere la plus fructueuse dans tous les exercises tactiques sur le terrain.*"

brigades and afterwards to divisions.[1]

It was not till March, 1864, when bitter experience had demonstrated the more excellent way, that the batteries of each Corps d'Armée were united into a brigade, and were placed under the command of one leader, with a distinct staff and supply department. Up till then, even in the Army of the Potomac, which was the first organised of the Union forces, the four batteries which were attached to a division were commanded by Captains, there was no officer in general command of them, no field officers, and no staff. The batteries, individually good, were but isolated units, and were attached like excresences to incongruous commands of infantry. There was no gradation of rank or command, nor was any combined action possible. There was, however, a "reserve" of artillery,[2] and the organisation of this reserve, side by side as it stands with the feeble system just referred to, well exemplifies the point we wish to lay stress upon. It was complete in itself, and had a distinct commander and staff. Its batteries being concentrated under the eye of an experienced chief, Major-General H. T. Hunt, were always ready to hand when needed, were more efficient than any others and came to be regarded with pride and confidence throughout the army. These batteries formed a "reserve" only in name, were always first in the fight, and foreshadowed, indeed, that "Corps Artillery" which became the trump card in the hands of the German Generals of 1870, and has been organised in almost all armies ever since then.

On the Confederate side the same difficulties were met by the same remedy, and before a year was out the genius of Lee, recognising what was required, had organised his isolated batteries into "battalions" of from four to six batteries, under the command of a Lieut.-Colonel or Colonel, while a Major was allotted to every two batteries.

Turning now to the war of 1870, we shall find the deficiencies of the French artillery largely attributable to the very same cause which had been shown inimicable to the arm during the American War. On the German side, not only had the batteries been trained to act in masses from the very commencement of the fight, during the interval of peace since 1866, but instructions were issued during mobilisation, laying special stress on this particular. In France, however, the battery had remained the tactical unit, and each acted for itself.

At Woerth we find the whole artillery force of the Germans, flinging itself in combination, with all the speed it could command, upon the foe. On the other side, although the French had 22 batteries on the field, there were never more than 17 in action at the same moment, and then they were too disseminated, and sometimes stood for as long as half-an-hour in position alone.

	Number of batteries in action on French sides.	
[3]From 9 o'clock to noon	9	
,, noon to half-past 1 o'clock	13	
,, half-past 1 to 2 o'clock	17	or perhaps a few more.
,, 2 to 4 o'clock	9	
At 4 o'clock	13	or perhaps a few more.

[1] *Vide* articles in the "Journal of the Military Service Institution," U.S.A., by General Tidball.
[2] 18 batteries, sub-divided into 3 brigades.
[3] "*L'artillerie de campagne en liaison avec les autres armes*," by Colonel Langlois. Vol. I., p. 368.

The three batteries of the 2nd Division (reserve) were not in action till 1 o'clock. Of the four batteries of the reserve, one (attached temporarily to the 7th Corps) took up its first position at 1 o'clock; the other three not until 4 o'clock. These batteries of the reserve were, it is true, held in concentration after 4 o'clock, but their opportunity had then vanished. They were put in position under the short-range fire of the German Infantry, and could do nothing but sacrifice themselves bravely.

Having thus examined the causes which have lain at the root of the artillery deficiencies and successes in the past, we can understand how it is that in every modern army the Brigade Division of three batteries has come to be regarded as the tactical unit of artillery, and that yet battery leaders need not be hide-bound by rigid rules. That unit has been evolved as the best during the experiences of the battle-field, and it is so recognised by all authorities.[1]

It may appear to those familiar with Continental organisations, that to dwell on the necessity for at least three batteries, held together under one command, being regarded as the tactical unit of artillery is unnecessary. Universal recognition is now, no doubt, given to the principle, but in our service where some batteries, owing to the exigencies of barrack accommodation are still isolated in their peace stations, and where some Majors have perhaps, never yet served in a Brigade Division at all, we still find a few so wedded to old-fashioned ideas that they regard the battery both as the tactical and fire unit, in spite of all the drill-book says to the contrary.[2]

The whole efficiency of a mass depends on the opposite principle being understood, and until we thoroughly appreciate the union of three batteries together, it is idle to talk of combining perhaps twelve or twenty. The Brigade Division is the foundation from which the mass must spring. At the same time, the independence of the battery leader, within his own sphere, must be carefully respected. The object of combining batteries is not to destroy that most valuable quality. It is rather to assist the subordinate commander, and relieve him of one set of responsibilities, in order that he may give his whole and undivided attention to what, after all, is the first duty of artillery, namely, fire. We must, therefore, in the formation of masses, remember that two interests, independence and subordination, have to be reconciled, but that they are not necessarily antagonistic.

The duties of the higher artillery leaders are tactical, those of the Battery Commanders technical—"*nicht die Waffe Kämpft, sondern der Mensch*"[3]—but there need be no more difficulty in both amply filling

[1] "*Les faits de 1866 ont fait comprendre aux Prussiens la nécessité d'un commandement supérieur, d'un commandement tactique du groupe, pour assurer la convergence des efforts, seule susceptible de produire un résultat, surtout dans l'artillerie.*

De là augmentation de l'unité tactique qui devient l'abtheilung et qui est organisée solidement."—Langlois. "*L'artillerie de compagne*," Vol. I., p. 239

"The great range and accuracy of the modern gun renders the combined action of a group of batteries far more effective than was formerly the case, and tends to increase the size of the tactical battle unit. The group of three or four batteries will, when practicable, be replaced by a unit of double its size, working under one command, and kept together prior to deployment."—Lieut.-Colonel Pratt. "*Précis* of Modern Tactics," 1892, p. 89.

[2] "Field Artillery Drill," 1893, p. 150.

[3] "*Die Entwickelung der Feld Artillerie, etc*," Vol. II., by Lieut.-General Müller. Berlin, 1893. And the personality of the leader should, therefore, influence as wide an area as possible.

their positions than there is in the case of a Brigadier and his Battalion Commanders.

In organising artillery masses we have, therefore, first to legislate for unity of command, and that is the chief essential to success. It, however, also forms the most difficult portion of our task.[1] We must endeavour to build up the mass from below. The battery leaders understanding and being uninterfered with in their sphere; the Brigade Division being held together, if possible trained together, and worked together in action; and its commanders, in turn, looking to a higher leader still when larger combinations are necessary. To this end it is desirable that in times of peace, whenever possible, such higher leader should assume direction of a mass, and it is especially desirable that he should do so at practice. It is only when guns are actually firing at targets, and can see tangible proof of the efficiency, or otherwise, of their handling, that lessons are appreciated. Moreover, on such occasions the necessity for a uniform system of direction becomes evident. All batteries and Brigade Divisions should speak the same tactical language. Then when on service, as must happen sometimes, batteries or Brigade Divisions have to be brought into position wherever space may be forthcoming, and they stand, perhaps, beside those which have been trained under other eyes, or are all at some eventuality taken in hand by a supreme leader, there must be no misunderstandings, no feeling of strangeness, and no lack of union.[2]

SECTION III.

System of Training.

"*En fait d'instruction, on n'est riche au jour de l'action que lorsqu' on est trop riche.*"—*de Brack.*[3]

It will be admitted that the *rôle* of him who guides a vast line of guns is one of such exceeding difficulty that it demands the very highest military qualities on the part of anyone who undertakes it. Not only should he display a complete grasp of general tactics, but he must have that facility in the compilation and issue of orders, on the ground itself, which is only to be acquired by constant practice.

It is not merely a question of manœuvring a great number of batteries. The following duties are what he will have greater need to excel in:—He must direct the preparatory reconnaissances, must define their special object, must be able quickly to satisfy himself as to their correctness, must form a decision rapidly, must write or edit the necessary orders, and must finally see that they are despatched sufficiently early to ensure their due performance. To conceive, be able to formulate and appreciate the full significance of what is ordered. These

[1] "The first difficulty of the application of artillery in masses lies in the system of command."—von Rohne, Professor of Artillery at Berlin.

[2] During the last manœuvres at Swindon, batteries not belonging to the same Brigade Division were, on at least one occasion, observed to come into, and remain in action perhaps as much as 100 yards apart. The practice provoked the criticism of the Chief Umpire, who ordered that under such circumstances the senior officer present should assume command of all the guns, and work them in combination.

[3] Introduction to his book on "Light Cavalry Outposts."

are the qualifications that are most essential to the artillery leaders, and it is only by constant practice on the field that they can be developed. A thorough tactical training the whole way through the hierarchy of command is necessary, and this can only be given at manœuvres, or, when these cannot be had, by exercising a mass of batteries against a marked enemy. To gain really valuable results it is desirable to exercise batteries at field firing. We cannot hope for much of this, in England at any rate, but something will be effected even when blank is only fired. At any rate it is certain that masses will not be efficiently handled in time of war if officers are not accustomed to them during peace.

The duties of the Officer Commanding a mass are, in the main, very similar to those of the Brigade Division (or in our service Divisional Artillery) Commander. He should keep in touch with the Officer Commanding the troops in general, and should endeavour thoroughly to grasp all his scheme. He should select the positions and targets for the Brigade Divisions; inform the supreme leader as to results obtained, ask for, if he does not at once receive, orders, when the situation alters; and in default of them, never hesitate to take the initiative when the circumstances of the moment require him to do so.[1] Further, it is well for him to remember that his orders should be brief and capable of liberal interpretation, and that he should only issue them when it is absolutely necessary for him to interfere. During the crisis of the fight he should also take care to explain, as closely as possible, to his Brigade Division leaders the way in which matters stand.

During the reconnaissance of the first fire position he will pay special attention to the position occupied by the enemy, and the ground available for his own batteries. Position is a paramount consideration in the question, and may be said to influence the efficient action of artillery almost more than any other. An eye for ground, such as will teach a man quickly to realise what sites will offer opportunities to his guns, should be cultivated. Not only that, but the space available must be clearly dealt with and judiciously apportioned amongst the Brigade Division Commanders. Next, the portion of the enemy's line which is to be fired upon must be similarly divided up. Otherwise, not only will the first batteries which arrive seize on the most visible targets, but they will too prodigally occupy the available space, leaving in their haste, too little for those who follow.

The functions of the Brigade Division leaders will be the same as when they are acting with their batteries alone, and similarly the Battery Commanders will follow the usual line which has been laid down for them in the drill-book, and which we need not discuss here. It is desirable, however, that fire should be opened simultaneously, and that it should be effective, if possible, from the very first. It should come, in fact, as much in the nature of a surprise as possible.

The experience of the French artillery,[2] which has carried out field-

[1] "But we must be careful to preserve the proper mean between absolute independence and the necessary dependence on the orders of the General Commanding."—von Schell, p. 34.

[2] *Vide* the account given in the "*Revue d'Artillerie*" for November, 1892. The exercises were carried out on a scale which is as yet unique.

firing at Chalons with a mass of batteries, tells us that careful and methodical preparations in a preparatory position[1] are desirable, and that, while much must always be left to circumstances, anything like excitement or precipitation in coming into action must be avoided. The necessity for rapidity must not, however, be lost sight of either, but time should be gained rather by everyone concerned thoroughly understanding what he has to do and how to do it, than by any visible hurry.

Since, at the commencement of an engagement a preparatory position could usually be selected under cover, the actual movement of the batteries into position would be only over a very short distance, and it would be carried out under the immediate orders of the Brigade Division Commanders, who should have little difficulty now in ensuring their practically simultaneous appearance. The leader of the mass would superintend the position of the limbers, and of the ammunition supply in general, but he will interfere as little as possible with his subordinates, and supply of ammunition will, as we shall later have more closely to consider, as far as possible be left in the hands of Battery Commanders.

The Officer Commanding the artillery (and in our service, as we have shown, he will often be in command of the mass) will, however, keep in touch with the Officer Commanding the Ammunition Column, and will on advancing into action inform that officer as to where he will be found.

As has already been stated, the formation of a mass would usually be with some definite end in view, and since such end will very often be to overwhelm some portion of an enemy's line by a concentrated fire, the distribution and concentration of fire will be a matter which must largely occupy the mind of him who directs it. Whether during the early stages of a fight, such as we are now discussing, it will be wise or feasible to so concentrate, is a matter on which it is impossible and undesirable to lay down any hard and fast rules. It is enough to say that the best results will be arrived at in the shortest time if successive portions of the hostile artillery are overwhelmed in turn.[2] It is believed that the rules now laid down in our service represent all that is necessary here to say on this subject, and that they have been well and carefully thought out.

Colonel Langlois, of the French Artillery, has, however, put forward a suggestion which is worthy of careful attention, and which, it is believed, will help us under certain circumstances to solve a problem which, until we have more experience from modern war to guide us, is beset with difficulty. When engaged with an enemy who is numerically more powerful than are you, it may often be impossible to ignore some of his batteries altogether, while concentrating on the remainder. We are told that it may then be a good plan to engage the whole of his front with a portion of your batteries, and then to concentrate a very rapid fire from the remainder unexpectedly, upon successively selected

[1] "It is, therefore, advisable that the whole of the batteries should be deployed together, under cover, immediately in rear of the position, and move into it simultaneously."—von Schell, p. 43.

[2] *Vide* "German Field Artillery Regulations," 1892, p. 151, paras. 307–8. "Journal of United Service Institution," Vol. XXXVII., p. 947. "Field Artillery Drill," 1893, p. 97.
"The maximum effect can only be obtained when fire is properly concentrated upon certain objects in the enemy's position."—von Schell, p. 103.

parts of his line. A sudden and overpowering storm of shells, which are termed by Colonel Langlois "*rafales*," may thus effect much.[1]

It is noted, however, that such a manœuvre will demand very exact training on the part of the artillery which undertakes it, if the vast expenditure of ammunition entailed is to be justified, and that it is only very highly-schooled batteries, backed up by prompt and perfect arrangements for the supply of ammunition, which could carry it out with success.

There is one other point which may be noted here, for it applies to every position which guns occupy where there are several batteries in line. It is sometimes thought, and possibly in one respect with justice, that exact drill and dressing are but of little importance now-a-days to artillery, or that, at anyrate, too much attention has been hitherto paid to them. In order, however, to ensure that the full activity of every battery shall be available for every emergency it is desirable, if possible, that they take up a correct alignment, otherwise it may happen that when fire has to be turned to a flank some of the guns may mask the fire of the others. Thus, if several batteries be drawn up on an uneven or slightly curved line and it should be necessary to turn fire considerably away from the target immediately in front of them, some of the guns in the centre may mask the fire of those on the flanks. Similarly, if the line of batteries be curved inwardly, those in the centre may find their fire interfered with by those that stand to their right or left. Moreover, to facilitate ranging it is desirable that the correct intervals between batteries be observed. The crest line of the height occupied should also run, if possible, at right angles to the proposed line of fire, otherwise the batteries may be enfiladed from some other portions of the enemy's position, a notable example of this form of error being supplied us in the faulty position of the guns of the German 9th Corps, west of Champenois, at the battle of Gravelotte. And when it is impossible to find suitable ground at right angles to the line of fire the artillery leader will have carefully to consider whether it is better that the individual guns stand in échelon along the crest line, or whether the batteries should be placed at right angles to the line of fire, and themselves be in échelon while their guns are in line.

The Advance from the First into the Second and other Subsequent Positions.

We now approach a portion of the subject where the question of how the batteries are to be manœuvred during an engagement becomes the dominant one.

Whatever may have been accomplished on the drill ground, it is probably not an exaggeration to say that no man can personally handle a number of batteries under fire by voice or gesture, or control them in the manner that the leader of a Cavalry Regiment can grasp his squadrons. The noise, the excitement, the very rattle of the *matériel* will prevent this—only an exceptional man can do it under any circumstances, and in war we must legislate for mediocrity, not for genius.

[1] "*L'Artillerie de Compagne*," Vol. I., p. 396, etc.
See also "Journal of United Service Institution," Vol. XXXVII., p. 948.

Hohenlohe, whose practical experience of modern war must make his opinions command attention, has said of artillery :—"It must always strive to fight, as a rule, by Brigade Divisions—coming into action by isolated batteries is quite an exception. Entire Brigade Divisions are not, however, to be brought into action by word of command, or by bugle call ordered by the Commander, but the batteries are to come into action by the word of command of the battery leader, upon the orders of the Divisional Commander."[1] But assuming that a mass of guns will be manœuvred by Brigade Divisions, we must still consider what will be the best tactical formation in which they should move. If the configuration of the ground will afford them cover, the question is one simply of convenience, and the decision may be left to the circumstances of the moment. But, if there be no chance of obtaining shelter a rapid advance to the front with as little depth as possible will be essential. If exposed to fire from a flank, column of sections at close interval will be best, but if, as is more usual, fire from the front has alone to be feared, a line will offer the best security. Yet to lead even three batteries in line across country is exceedingly difficult. We know it is true that von Bronikowski did thus lead three batteries into action over a stretch of more than two miles, on the 2nd of December, 1870,[2] but this is such an exception as rather proves the rule. Officers who have experienced the arduousness of the task will admit that there is considerable difficulty in preserving dressing, and that the flanks are always inclined to get too far forward. It is believed to be more feasible to handle the batteries at short échelon, a formation which offers many of the advantages of line, and is far more elastic.

Reconnaissance of the Second and other Positions.

The reconnaissance of the second and subsequent positions must be made while the advance of the batteries is in progress. The leader of the mass will hurry on, and make the most of the fleeting moments with the same ends in view as he had before. He must now, however, keep a sharp look out for any dead ground in the neighbourhood, and seek protection if necessary from the nearest troops. The Commanders of Brigade Divisions will move ahead of their commands to him, and receive his instructions. It will now rarely be possible to surprise the enemy, and the first consideration will therefore be so to place the guns that they have the best possible chance of quickly killing their opponents. When a Brigade Division leader leaves his batteries he must always hand over the command to the next senior. The duties of all concerned will be very similar to what they were in the first position. Circumstances will rarely or never justify a preparatory position, but an attempt at least should be made to preserve as much of the same methodical procedure as is possible. It will not often be safe now to place guns behind the crest, because in these positions they may be exposed to attack from infantry, and must have as little dead ground in their front, therefore, as possible. A position on the crest, while more exposed, will frequently at this stage become obligatory.

[1] *Vide* translation by Captain J. M. Grierson, p. 605, Vol. XIV. of "Proceedings" of R.A. Institution. *Vide* also the opinion of von Schell in his "Field Artillery Tactics," p. 43.

[2] *Vide* "*Kriegsgeschichtliche Einzelschriften*," Vol. VII.

Concentration of Fire to prepare the way for the Infantry Attack.

It is to effect this purpose that masses of guns have in the past most frequently been employed. It was the invariable practice of Napoleon thus to use his artillery, and his success was so marked that his example was not thrown away by others. We have shown that since guns have become endowed with increased range, a concentrated fire from a large mass of them may be turned to account, even during the earlier phases of the fight, while the most modern employment of the arm exhibits examples of the use of concentrated masses beyond even what was attempted by Napoleon. Thus during the French army manœuvres of 1892, the guns of more than two corps were massed by General Saussier, against the village of Nargerie, at the battle which took place close to it.[1]

Moreover, to win victories men must ultimately come into personal collision, the hostile fire must be subdued to enable them to do so, and to effect this the aid of guns is necessary, and must always be invoked to bring about the culminating movement of the day. Where both sides are equally well armed, no progress can be reckoned on in the future, any more than in the past, until some overpowering force to create a crisis is called in. At the decisive moment, therefore, a mass of guns must be ready to turn the full blast of destruction on the decisive point. It is with this end in view that it should struggle during the earlier hours of the day, and it must disregard its own safety, and risk annihilation to support the infantry now.

It is, however, exceedingly arduous, especially during the close of an engagement, to preserve so close a grasp of every unit as will ensure success. The heavy firing will interfere with the issue and comprehension of orders; it is difficult with many batteries in line to make good practice; and finally it is not by any means easy to keep up the fire to the very last, and yet stop it just at the moment when the infantry are closing on their opponents. Yet the storm, when once let loose, must rage with pitiless fury until the bayonet is ready to take up its work.

A mere recital of what is demanded, and what is in the way, is sufficient, without further words to show how absolutely essential a very careful and frequently practised system of training is required if success is even to be hoped for. What we need, to be equal to such a task, is practice on the drill-ground, and that too, if possible, with projectiles. If such a consummation cannot be arranged for, then without, but at any rate, exercises in some shape or form, and where it is feasible, with other troops. At such manœuvres, the best method of carrying out concentration, to the great end, will be evolved for us, and, being based on experience, it will be more valuable than any paper theories.

It may be well, however, to indicate the salient features that will probably govern our decisions.

The leader of the mass will be informed beforehand by the Commander-in-Chief what Brigade Divisions will be required to actually cannonade the point selected for assault, while the remainder guard

[1] *Vide* "Journal of the United Service Institution," Vol. XXXVII., p. 965.

the field of operations in general,[1] and the exact point selected will be explained to him as nearly as possible.

We must confuse our minds with no pedantries. When in tactical language we speak of a point we may refer to a considerable extent of ground. That space will next be divided, if necessary, amongst the various Brigade Divisions, and the leaders of these will endeavour to gauge and verify, if time permit, by a few rounds, the ranges of their targets. They will instruct their batteries as to the duties assigned to each, and will give orders as to whether fire is to be distributed as regards depth. The French consider that during the latter stages of an action ranging may often be found impossible, and that when this is so it will be wiser to distribute fire by the system of "*Tir progressif*,"[2] or distribution as regards depth (each battery section or gun, as the case may be, using a different elevation).

The battery leaders will similarly instruct their Section Officers, and through them their gun-layers. It is necessary, also, to agree on some signal that may be readily understood, by which the moment when guns are to leave the target they may be engaged with, and turn to their most serious duty, shall be indicated. During the recent manœuvres at Chalons, the Brigade Division which was nearest the infantry destined for the assault, was given the hour by the leader of these troops, and at the proper moment fired three battery salvoes rapidly one after the other, which formed the signal to the remainder. As might be anticipated, however, mistakes sometimes occurred, owing to the nature of such a signal, but on the whole we are assured that good results were obtained. It is noteworthy that during the bombardment of Plevna, some of the heavy Russian siege guns attempted, in a somewhat similar manner, to direct the fire of the remainder, but with very bad results.[3]

A message conveyed quickly, or some sign passed rapidly from battery to battery, would appear a preferable arrangement.

With this consummation of its usefulness the potency of a mass of guns may be regarded as exhausted. Individual Brigade Divisions or batteries may accompany and follow up the rush of their brethren of the other arm, but scarcely so an agglomeration of units. Whether in view of the immense losses amongst horse-flesh that must supervene such an attempt will be often made, is a question; but, if the foe retire in anything like a rout, even a huge mass might undoubtedly advance to his position, and from thence pursue and harass him by fire; for it cannot too often be inculcated that as long as the foe remains within effective range, the pursuit by fire should never be allowed to slacken.[4]

Ammunition Supply.

No discussion as to the training of artillery for war can be complete without some words as to ammunition supply. Our labour in perfect-

[1] It is usually necessary to continue to engage the artillery of the defence with some guns, "otherwise it will direct its fire on the attacking infantry, and inflict serious losses on it, to which it must not be subjected."—von Schell, p. 77.

[2] *Vide* the report on the field firing of masses of artillery, at the Camp of Chalons, in 1892, already referred to.

[3] Kouropatkin on the Russo-Turkish War; translated into German by Krahmer.

[4] The point is well brought out by Lieut.-Colonel Regenspursky, of the Austrian Army, in his recent book: "*Studien über den taktischen Inhalt, etc.*"

ing a fire-engine would be futile did we not first ensure that the reservoirs which are to feed it shall be full, nor will anyone but a spendthrift live upon his capital (as a battery does in action) without anxious forethought as to the future.

The method of ammunition supply, based as it is on actual experiments carried out at Aldershot, in May last, which is now laid down in the drill-book,[1] is sufficiently satisfactory, and renders it unnecessary for us to go much into detail.

The Officer Commanding a mass of artillery will not interfere with battery arrangements unnecessarily, but will exercise such a general supervision that there may be no obstruction to the free flow of ammunition from the rear. He will likewise do well, when formulating his plans, to consider how far the expenditure of ammunition involved will be justified.[2]

The stage of the fight, the hour of the day, the quantity of projectiles in hand, must all be carefully and rapidly weighed in his mind, and without unduly encumbering this discussion with details which are not distinctly proper to it, he may be reminded that in round numbers, leaving out of consideration case (only useful on particular occasions), there are :—

Divisional Artillery.

With each Battery	100	shell
„ its 1st Reserve (Divisional Ammunition Column)	70	„
„ „ 2nd „ (Ammunition Park)	70	„
Total	240	„

Corps Artillery.

With each Battery	100	shell
„ its 1st Reserve (Corps Ammunition Column)	72	„
„ „ 2nd „ (4th Section Ammunition Park)	68	„
Total	240	„

How long, therefore, can he count on his fire being sustained ?

With ordinary fire one box (18 rounds) will last half-an-hour, or an hour's fighting will absorb 36 rounds. Therefore, the battery supply will last three hours ; that of the 1st Reserve two hours ; and that of the 2nd Reserve two hours. He can rely, therefore, on his batteries being able to maintain the struggle, for seven hours continuously, at an average rate of fire of four rounds per battery per minute.

At Vionville one German battery fired 1164 shells, and several others got rid of more than 1000, while at Gravelotte, the battery most heavily engaged expended very nearly the latter number. But, taking a fair average and bearing in mind that although ammunition columns are primarily intended for particular units, they are never to refuse ammunition where it may be urgently required ; if arrangements are judiciously made, there should be enough ammunition to supply the demands of any battle.

[1] "Field Artillery Drill," 1893. Chap. IV., Sec. 13.

[2] "The rapidity of firing should be regulated by the Officer Commanding the Artillery."—von Schell, p. 52.

One word may be added ere we leave this portion of the subject. The supply of ammunition should be under the Battery Commander. The experiences at Aldershot, last May, convinced every officer who witnessed them of this, and it was felt that decentralisation was the best policy to be pursued here. While, therefore, the higher leader should exercise a wise, far-seeing, and careful superintendence, he should avoid anything approaching interference in what is to the battery a technical matter.

Conclusion.

"A ring of steel discipline."[1]

In conclusion we have only to add that the use of artillery in masses is no new thing,[2] and that we need depart from no traditions nor break with any cherished sympathies, when we loyally accept what the exigencies of modern war have imposed upon us. We may still be proud of our batteries, still respect the prerogative of their leaders, but we must give effect to our views under changed circumstances in a different way. A man will not clothe himself in precisely the same costume in January and July. In one case he may wear fur, in the other flannel. But he will nevertheless always dress on the same principle and to the same end, namely, to keep his body warm. Artillery has the same objects in view now as it had at the commencement of the century, but its application must be modified, nevertheless, to suit the alterations which the march of science has drawn with it. Where the battery was once all-sufficing, the Brigade Division must now take its place, and we must work through even that unit to larger masses still, as long as we organise our army on Continental lines at all. Artillery was always most effectively employed when it was thrown ungrudgingly into the scale. The growth and continued advance of ballistic science has not only developed the possibility, but has increased the necessity, of so employing it. Where large armies meet it will indeed be impossible to handle it otherwise. This being so, and bearing in mind the difficulties of directing the fire of even three batteries, how important is it for us to strive after a good and uniform system of dealing with that of several Brigade Divisions? We cannot hope to come even within sight of perfection unless we have opportunities of practice during which every link in the chain may be tested, and every soldier, from the very highest to the lowest, learn to understand one another, to support one another, and work together for the common end. Our discipline, especially as regards fire tactics, must control a wider field than that occupied by six or even eighteen guns. So shall artillery always be enabled to fulfil its *rôle* of opening the battle, of smothering the hostile guns, of shaking the enemy's infantry, of pursuing with avenging shells the flying foe; and thus, if it do not actually gain the victory, it may claim, at any rate, that the road thither has been paved by its exertions.

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[1] "French Revolution."—Carlyle.

[2] Thus, Lieut.-General Müller in his recent volume on "*Die Entwickelung der Feld Artillerie, etc.*," points out that the modern views with regard to artillery tactics, based as they largely are on the experiences of 1866, closely correspond with those laid down by Tempelhoff, in the translation by Paget: "*Essai sur l'usage de l'artillerie dans la guerre de campagne, etc.*," published in 1771.

THE BREEDING STUD OF AN INDIAN PRINCE.

BY

COLONEL T. B. TYLER, R.A.

Bhavnagar, in Khatiawar, is one of the most prosperous and best managed states in India. During the reign of the present Maharajah, public works, conceived and carried out in pursuance of a wise and liberal policy, have been completed, and the plans of more are prepared, and will be begun in due time. Large reservoirs of water, with an ample supply for reserve purposes, have been constructed in the city; there is a spacious hospital, a college, a park of 450 acres—in which will be laid out ornamental lakes with islands to harbour wild fowl; and within the bounds of which antelope, nilghai, and various deer will wander freely—there are avenues of trees, and good roads everywhere. The gem of the city is a tomb to the late Maharani, built of Carrara marble, curiously and beautifully carved by local artists; part of the design being after the famous carved windows at Ahmedabad; and there is some undercutting quite exquisitely wrought. In the building of the hospital and college the Hindoo style of architecture has been followed, the chief characteristics of which are the dome, the cusp, and the flat band; the Hindoos build no arches, they distrust them, and justify the suspicion by the proverb "The arch never rests;" meaning, that a power of thrust is always exerted.

Some sixty miles from Bhavnagar lies the famous forest of the Gir, through which roam the few lions still existing in Asia. They are carefully preserved, and only one or two have been shot in the last four or five years; the Political Agent told me it was supposed there were about fifty still in existence, and he thought their numbers had not altered during the last twenty years. The reasons they do not increase seem to be that a good many cubs are captured for menageries, and that some are killed by the owners of the flocks and herds in the country surrounding the forest; for the lion is to the flockmaster a much more unpleasant neighbour than the tiger, who hunts alone and kills only what he requires for food; lions hunt in troops and will often kill a dozen cattle for sport. They breed in caves, and the natives, aware of this habit, light fires at the entrances and smother the inmates. It is interesting to note that lions and tigers inhabited the jungles surrounding Mount Aboo, near Deesa, less than thirty years ago, and though the lions have disappeared there are tigers there still, The tiger seems to possess, in a greater degree than the lion, the capa-

city to withstand the annihilating effects of the encroachments of civilisation.

The Maharajah possesses a breeding stud with paddocks, sheds and boxes; the brood mares number about 100, and are of all breeds; English, Australian, Arab, New Zealand, and country-bred. Hitherto the mares have not been selected on any principle, but it is probable that in the future approved mares only will be admitted to the stud. Of stallions there is the English horse "Reputation," imported by Lord William Beresford—probably the best miler of his day; an Australian, several Arabs and country-breds. The stallions, mares and young stock are all in excellent condition, and the youngsters perfectly quiet and tractable. Colonel Humfrey writes: "In the Bhavnagar stud, where the young stock have every care and kindness lavished on them, the youngsters, though quite unbroken, are so confident and fearless that on a stranger entering the yard they crowd round him in a most inquisitive manner, allowing themselves to be stroked, handled, or led about, in a way that is pleasant to witness, and which speaks volumes for the treatment they receive, and, in after life, I have noticed that those who come from these paddocks display the same gentle manners."[1]

The object of the Maharajah is to improve the breed of horses throughout his territories; and there are interesting particulars regarding the Khatiawar horse to which, as they may not be generally known, I will briefly refer. For many generations the Khatiawar horse has been much sought after, on account of his speed and endurance; the various chiefs vied with each other in keeping up the distinctive characteristics of the different castes, and until the last twenty years it was no more possible to procure a high-bred "Khatty," out of his own country, than it is to get a true Jersey or Guernsey cow out of the Channel Islands. Owing to facilities of communication by railways, the distinctions are not so sharp as they were, but still the people cling to the old traditions and cherish the old breeds, and you must go to Khatiawar to see them at their best. It is believed that the favourite and prevailing colour is dun, with a dark stripe down the back, but Colonel Humfrey writes: "My intimate knowledge of the breed leads me to disbelieve the theory. There are not more dun horses in Khatiawar than in any other part of the country." A mark of the breed which is greatly prized is the peculiar pointing of the ears, which arch inwards, so that when pricked the points nearly meet. I have nowhere seen such beautiful heads as those of the high-caste "Khatty" horses; indeed, the model the native breeder takes as his ideal is the form of the antelope. "Where," he says "do you find such swiftness, endurance, and beauty as in the antelope;" when you object to the want of bone in his horse, he replies that the antelope also has small bones; if you remind him that the antelope is not called upon to carry eighteen stone on his back, he scornfully retorts: "You mount your horse, I will mount mine; we will race, and I shall win." The arrangement of the terms of such a match would present some difficulties, and I am not

[1] "Horse Breeding and Rearing in India." By Major John Humfrey, Bengal Staff Corps, F.Z.S. 1887.

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aware of any record of a satisfactory trial; but I have been told by men well acquainted with the country that if you sent a "Khatty" man on his own horse, on an urgent message, for thirty or forty miles across a rough country, it would take a very good Englishman to beat him. The different castes of breeds are jealously observed, as are the traditions regarding them; for instance, in the Pirani Tajan horses, which have the reputed merit of conveying their masters, if wounded in battle, out of action to their homes. In modern warfare, similar conduct on the part of a charger, might lead to misunderstandings with the military authorities.

The Maharajah holds a horse show every year, at which the animals bred in his paddocks are exhibited, but for classification only; the prizes, rather over 2000 rupees in value, being taken by the other exhibitors. This year there were about 420 horses entered, an increase of 100 over the entry of last year; all expenses are defrayed by the Durbar, and as may be expected from an idea conceived and carried out on so liberal a scale, the show is becoming very popular. I was asked to act as one of the judges, an office I accepted with a great deal of pleasure; and I may say that the kindness and hospitality which I received while at Bhavnagar, could not have been exceeded.

Mr. Proctor Sims, the State Engineer, is a man of many parts; from his designs, and under his supervision, the numerous public works which have sprung into existence during the last twenty years, have been executed; and it is owing to his skilful administration that the Bhavnagar stud has attained its prominent position; it is scarcely necessary, therefore, to state that the arrangements of the show, made by him, left nothing to be desired.

The show was held in the new park, which was gaily decorated with arches and flags, and an immense marquee was pitched as a shelter from the sun; there were a fair number of spectators, and next year, when jumping will be included in the programme, the day will be celebrated as a state holiday. This year a couple of jumps were put in front of the marquee, on the second day of the show, and encouraged by the example of Bhav Singji, the eldest son of the Maharajah, who rode his own two mares—both bred in his father's paddocks—pluckily and well, several of the Imperial Lancers and some natives jumped their horses in good style, mostly riding bare-backed. It was interesting to observe how the incidents usual at a jumping competition—the refusal of a horse, the loss of a turban, the struggle of a rider to maintain his seat—upset the Oriental gravity of the spectators and moved them to mirth, as similar occurrences do lookers-on in western lands. There were a good many animals in the show-yard of an inferior quality, but there were a few of the higher types of Khatiawar horses. Perhaps the best animal in the show (putting aside the horses belonging to the stud) was a dun pony with black points, a model of strength and full of character; I believe he was afterwards bought for the stud. Another notable animal was a beautiful white mare, who might well have inspired Browning's poem of "Muléy Keh." Indeed, if the "Khatty" mare of the highest castes had been studied by the poets I believe she would have supplanted the Arab as a subject for their songs.

The problem Mr. Proctor Sims has set himself to solve is: "What is the combination of blood which will produce the animal most suitable (1.) To mount the Imperial Lancers, and do the ordinary work of the Durbar. (2.) For sale to the Indian Government."

I would point out that Government, being by far the largest customer for horses, must be first considered by anyone carrying on a breeding establishment. As I have stated, the brood mares belonging to the stud are of all sorts; so there is a fine opportunity for comparing the results arrived at by combining different strains of blood; and it was the opinion of those present at the show, that the best stock were the produce of country-bred mares with two strains of Arab in them, crossed with an English or Australian thorough-bred horse. The Remount Agent of the Bombay Presidency bought three colts of this class; bays, 3½ years old, 14 hands 2½ inches in height, with good bone and action, excellent shoulders, unusual length of rein, of good frame, and true-made all over. They were perfectly tractable, and I have no doubt that at five years old they will be powerful horses, 15 hands high; and being full of quality they should make ideal light cavalry remounts. And as the light cavalry horse is the animal best suited for private work in this part of India there should be no difficulty in selling any number of them.

A country-bred is thus defined by the West of India Turf Club:—"A country-bred horse is one foaled and reared in India, the country and breeding of the sire and dam being quite immaterial as regards this definition; but the latter must have been in India for 12 months immediately preceding the birth of the foal."

Thus the produce of an English horse, and an English mare who has been a year in the country, would be a country-bred; but the animal I allude to in this paper is one descended, on the dam's side, from the indigenous breeds of the country. Of these indigenous breeds there are, according to Colonel Humfrey, only three: the Khatiawar, the Deccan and the Sind; "but," he adds, "the Punjab has always been noted for its horses." I have no intention of comparing a country-bred with an Australian—a superior animal in every way—nor with the high-class Arab, whose beauty, courage, docility and endurance will always, in spite of his being an execrable hack, maintain him in the position of a public favourite; but it is passing strange that so few horses are bred in India as to make it necessary to import the large numbers of Persians and inferior Arabs which may be found any day in the stables of the dealers at Bombay. For a country-bred is a better horse than an Arab, and according to the rules of the turf clubs has to give him a stone in class races; and though he is not so taking a horse in appearance, he has better shoulders, and is in consequence a better hack; he is a better jumper, equally good at polo, better in harness; he is, however, deficient in the attribute of courage so conspicuous in the Arab. It is sometimes said the country-bred is dangerous and vicious, but Colonel Humfrey denies this accusation: "I have had considerable experience with them, and say with confidence, that as a breed they are especially good-tempered and amenable." I find in the Report of the Army Remount Department, that "the prices now authorised for country-bred

horses are higher than for remounts of any other class. This is no doubt right, in view to the promotion of the indigenous supply. . ."[1] But if he is a better horse than the Arab for general purposes, and if Government pay more money for him, why is he so difficult to get? This is a question not easy to answer; there are some reasons, but I cannot say they are sufficient ones. In the first place, if the process of breeding arrived at by the Bhavnagar stud is the correct one, it takes a long time to breed the mare which will produce the best sort of colt, and there are few such mares in the country as yet. Then, whatever was the case in former times,[2] India is not a horse-breeding country, in the sense that parts of England, Ireland and Australia are; there are no enclosed and watered paddocks or fields, as in England and Ireland, no extensive grass runs as in Australia. There are plains, it is true, but no herbage fit for horses grows on them; and whatever land is of any value is under cultivation. The flocks of cattle, sheep and goats are tended by herdsmen, who keep them out of the crops, but it is obvious that a drove of colts could not be "rounded up" by such slow-moving guardians. Therefore, horses kept for breeding purposes must be confined in the villages and stall-fed; an expensive method of rearing, and one that can only be practised on a very small scale. In the Report of the Remount Department it is stated that in a certain district of Bengal "the Remount Agent estimates having inspected 1200 horses, all were in excellent condition but were tied up in villages, and deprived of any liberty whatever." Such a system of rearing is not only expensive, but bad; loss of liberty prevents development of bone and limb, and is a certain cause of deficient and faulty action. It is also said that breeding is discouraged by the importers of other breeds, especially the Arab dealers of Bombay who, aware that the country-bred is a better horse than their own and fearing to lose a part of their lucrative trade, use their influence to prevent his being allowed to compete with Arabs in the races in Western India. Such influence, if it exists, can scarcely be very strong, for I observe that in the prospectus of the Poonah Races, out of twenty-six races, fifteen are open to country-breds. Then, of course, the chiefs no longer maintain the immense armies which existed at the beginning of the century, and I suppose this must be the main reason for the almost incredible decrease in the number of horses bred now as compared with the state of affairs ninety years ago.

Since the discontinuance of breeding studs, the Indian Government have instituted a system of "nurseries," in which a certain number of young stock are kept in paddocks and issued to the services at four years old. They are bought at any age under four, but for the most

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[1] Annual Administration Report of the Bengal, Madras and Bombay Presidencies, 1892-3.

[2] At the out-break of the Mahratta war, in 1802, "the armies of Doulut Rao Sindia and Rughoojee Bouslag were estimated at about 100,000 men, of whom about 50,000 were horse." At the battle of Assaye, in 1803, the Mahratta army "amounted to upwards of 50,000 men, of whom more than 30,000 were horse." When Holkar attacked Delhi, in 1804, during the campaign which ended in the siege of Bhurtpore, "he was at the head of 60,000 horse, 15,000 infantry and artillery, with 192 guns." At the battle of Kirkee, in 1817, the Mahrattas had 23,000 horse.—"History of the Mahrattas," by James Grant Duff.

part between two and three years old. I find from the Remount Report that the numbers in possession in March, 1893, were:—

Hapur	881
Kurnal	554
Ahmednagar	182
Total	1617

But as the following table shows even this modest number is not easily kept up:

	Sanctioned Number.	Purchased.
Hapur	375	437
Kurnal	375	154
Ahmednagar	100	47
Total	850	638

The system is an excellent one, and the Government is so thoroughly in earnest in the matter that the nurseries will doubtless be enlarged as soon as a greater number of young stock can be secured.

The most significant portions of the Report of the Army Remount Department are the references to the experiment of introducing the Norfolk trotter into India, with a view of obtaining a stronger class of remount. The Director, Army Remount Department, writes: "The Norfolk trotter strain has doubtless done much good in producing power and substance. But many of the stallions of this class were doubtless introduced with a view to producing remounts fit for the artillery in India. Judging from past experience, I do not see much chance of this hope being realised, and meanwhile the class of horse produced for the cavalry suffers from the shortness of neck and heaviness of shoulder of the strain referred to. I think the Arab and thorough-bred English stallions produce the best remounts to be seen at the depôts, and that it would be well to steadily increase the sires of this class. . . . I would strongly recommend that the agency for purchasing stallions be given a free hand in this matter, so that, if necessary, the purchase of Norfolk trotters may be curtailed. . . . ." And again: "The horses obtained therein (the Punjab districts) are wiry, compact and good, and compare very favourably with those produced in the North-Western Provinces, but they would be all the better for less of the Norfolk trotter strain, which is always remarkable for short necks and heavy shoulders." I have taken some trouble to find out the opinion of the army in general on this point, and my correspondents are unanimous in condemning the indiscriminate use of the Norfolk trotter stallion; and there is little doubt but that the Government of India will listen to the remonstrances of its responsible officers, and stop the importation of the class. No great harm has been done yet, and that the experiment has not been entirely successful is from no fault on the part of the Government, who have used every endeavour to improve the country-bred horse.

The Hackney class is not a large one, and so fashionable has it become, that almost all the colts are offered for sale entire. In the report

of the last Hackney show in *The Field* the following remarks occur: "The Hackney Horse Society has this year instituted classes for geldings. . . . truth compels one to say that they are a sorry lot. . . the proportion of stud horses of the Hackney breed is, beyond all question, far in excess of all requirements, and if three-quarters the number were 'added to the list' to-morrow, no great harm would be done." When it is considered that the best stud horses are kept at home, and that the Continental buyers, America and Australia, eagerly compete for the next best, there is much reason to fear that most of those purchased by others, are among the lot condemned by *The Field* as useless for breeding purposes. And a trotter stallion of the second class is but a moderate animal, while one of a lower degree is generally a bad one.

I would strongly advise any persons breeding in India, to follow the example of the Bhavnagar stud rather than embark on the experiment of trying the trotting horse. No doubt, if they could secure the services of "Danegelt" or "Ganymede," or Hackneys of the very first class, the result would be good, but as that is impossible, they had much better use English and Arab sires. And though I do not think that country-breds will ever be produced of sufficient weight and strength for artillery or heavy cavalry, I believe, that for all general purposes—military and civil—they will be found, not only suitable, but superior to every other breed.

I do not think that, in the Bombay Presidency at anyrate, it is understood what kind of mare produces the animal best adapted for the services, nor with what sire she should be crossed. Now, though it is not to be expected that breeders will not exercise their own discretion in the matter of breeding, I think many would be glad if the experience gained could be, from time to time, circulated for information. There seems to be now no officer able to give authentic information as to the results arrived at. I observe, in the Report on the Army Remounts, that the Director expresses a strong opinion that clear instructions should be given to officers of the Department on general matters connected with it "on account of their limited tenure of appointment;" it seems to me that in these instructions might be included a *précis* of the knowledge and experience stored in the Government records of horse-breeding, for the benefit of breeders and others anxious for information. It may be answered that this is the business of the Civil Veterinary Department; in my opinion, it is the business of everyone who is responsible for, or interested in, the supply of horses in India.

Note.—There are, in addition to the native regiments, three regiments of British Cavalry, mounted on Arabs and country-breds; of these I have only seen the 7th Hussars, whose horses consist of 367 Persians, 46 country-breds, 98 Arabs, and 21 of other breeds; the Persians are considered the best, next in estimation are the country-breds, and the Arabs are last in the order of merit. But I saw no country-breds of the class of those bred at the Bhavnagar stud.

ARTILLERY MOBILISATION.

BY

MAJOR F. G. STONE, R.A.

(Continued from p. 287, No. 6, Vol. XXI.)

CHAPTER IV.

II.—Ammunition Columns.

A nucleus of one Warrant Officer and six men has been formed for each Ammunition Column. To this nucleus is assigned the care and custody of all the equipment of the Ammunition Column. The *personnel* required to complete to War Strength is detailed as follows:—

Officers—By the Deputy-Adjutant-General, R.A., from officers serving.

N.-C.O.'s. and Men—By the Officer Commanding Horse and Field Artillery, Woolwich, from men serving and from Horse and Field Artillery Reservists.

The plan adopted for completing to War Strength in N.-C.O.'s. and men has already been explained at p. 281, No. 6, Vol. XXI.

On mobilisation, the officers and men serving will proceed at once to the places of mobilisation of their columns, and the equipment will be drawn from the Ordnance Store Department. The Reservists will join at Woolwich and be clothed by their respective depôts, they will then proceed to the places of mobilisation of their columns. Horses will be drawn in the manner detailed under the head of "Duties of Officers Commanding Units," at p. 213 (*h.*), No. 6, Vol. XXI, from the centres shown at p. 278, No. 6, Vol. XXI.

The constitution of the Ammunition Columns on mobilisation varies according to the nature of its allotment; there is also a slight difference in the establishments for Home Defence and Service Abroad.

The following table shows the normal establishments, and is applicable as regards Home Defence to columns No. 12 and 16; column No. 8 belongs to the 1st Army Corps (Corps Troops), which has three batteries of Horse Artillery instead of two for Corps Artillery, the Corps Ammunition Column has, therefore, to be increased by—

2 Ammunition Wagons with Limber, R.A., and
2 Ammunition and Store Wagons for Gun Ammunition,

involving an increase in *personnel* of—

4 Gunners,
12 Drivers, and
24 Draught Horses.

Corps Troops Ammunition Column.

Ranks.	"Personnel."												Horses.					
	Officers.		Warrant Officer, Staff-Sergeants, and Sergeants.		Artificers.		Trumpeters.		Rank and file.		Total.		Private or provided under allowance regulations.		Public.			
															Riding.		Draught.	
	Home Defence.	Service Abroad.	Home.	Abroad.	Home.	Abroad.	Home.	Abroad.	Home.	Abroad.	Home.	Abroad.	Home.	Abroad.	Home.	Abroad.	Home.	Abroad.
Major	1	1	...	...	...	...	...	...	...	...	...	...	1	1	1	1	...	...
Lieutenants	2	2	...	...	...	...	...	...	...	...	3	3	...	...	2	2	...	...
Sergt.-Major (W.O.)	...	...	1	1	...	...	...	...	...	...	1	1	...	...	1	1	...	...
Batty.-Sergt.-Major	...	...	1	1	...	...	...	...	...	...	...	...	...	...	1	1	...	...
Batty.-Q.-M.-S.	...	...	1	1	...	...	...	...	...	...	...	...	...	...	1	1	...	...
Farrier-Sergeant	...	...	1	1	...	...	...	...	...	...	9	9	...	...	1	1	...	...
Sergeants	...	...	6	6	...	...	...	...	...	...	...	...	...	...	6	6	...	...
Shoeing-Smiths	...	...	...	...	5	5	...	...	...	...	...	...	...	...	1	1	...	...
Collar-Makers	...	...	...	...	3	3	...	...	...	...	11	11	...	...	...	...	...	...
Wheelers	...	...	...	...	3	3	...	...	...	...	...	...	...	...	...	...	...	...
Trumpeters	...	...	...	...	...	...	2	2	...	...	2	2	...	...	2	2	...	...
Corporals	...	...	...	...	...	...	...	...	6	6	...	...	...	...	6	6	...	...
Bombardiers	...	...	...	...	...	...	...	...	6	6	...	...	...	...				
Gunners	...	...	...	...	...	...	...	...	42	43	158	164	...	...	...	...	...	...
Drivers	...	...	...	...	...	...	...	...	104	109	...	...	...	...	...	...	168	178
" Spare	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	16	16
Total	3	3	10	10	11	11	2	2	158	164	184	190	1	1	25	25	184	194

Home Defence, 184 210
Service Abroad, 190 220

Transport for Corps Troops Ammunition Column.

Vehicles.	Number.		Drivers.		Draught Horses.	
	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.
Carriages, Spare, Gun, with Limbers, 12-pr.	4	4	8	8	16	16
Carts, Small-Arm Ammunition	2	2	2	2	4	4
Wagons — Ammunition, with Limbers, 12-pr.	10	10	30	30	60	60
Wagons — For Gun Ammunition	10	10	30	30	60	80
Wagons — " Small-Arm Ammunition	2	2	6	6	12	12
Wagons — and Store, R.A. — " Stores	1	1	3	3	6	6
Wagons — and Store, R.A. — " Equipment and Supplies or Reserve Rations	2	1	4	2	8	4
Wagons — and Store, R.A. — " Supplies	...	1	...	3	...	6
Wagons — and Store, R.A. — " Tents	...	1	...	2	...	4
Wagons — Forge, with Limber, R.A.	1	1	3	3	6	6
Spare	...	...	18	20	12	16
Total	32	33	104	109	184	194

It will be seen that the difference between Home Service and Service Abroad is merely due to the fact that tents are carried in the latter case, and that instead of having two four-horsed wagons for equipment and supplies as in Home Service, one of these is used for equipment and reserve rations, while the other, with an additional pair of horses, is

used for supplies only; there is also a small increase in the number of spare horses.

The "Special Field Force for Service Abroad," the constitution of which has already been explained, being not a complete Army Corps, has no Corps Troops Ammunition Column.

The *Infantry Division Ammunition Column* is the next to be considered. The establishment of *personnel* is precisely the same, both for Home Service and Service Abroad, as it is for the Corps Troops Ammunition Column, with the addition of—

6 Gunners,
6 Drivers, and
12 Draught Horses.

The number and nature of the vehicles included in the Transport, however, varies considerably from that for Corps Troops Ammunition Column.

Transport for Infantry Divisional Ammunition Column.

Vehicles.	Number.		Drivers.		Draught Horses.	
	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.	Home Defence.	Service Abroad.
Carriages, Spare, Gun, with Limbers, 12-pr.	1	1	2	2	4	4
Carts, Small-Arm Ammunition	10	10	10	10	20	20
Wagons: Ammunition, with Limbers, 12-pr.	6	6	18	18	36	36
Wagons: Ammunition and Store, R.A.: For Gun Ammunition	6	6	18	18	36	36
Wagons: Ammunition and Store, R.A.: " Small-Arm Ammunition	11	11	33	33	66	66
Wagons: Ammunition and Store, R.A.: " Stores	1	1	3	3	6	6
Wagons: Ammunition and Store, R.A.: " Equipment and Supplies or Reserve Rations	2	1	4	2	8	4
Wagons: Ammunition and Store, R.A.: " Supplies	...	1	...	3	...	6
Wagons: Ammunition and Store, R.A.: " Tents	...	1	...	2	...	4
Wagons: Forge, with Limber, R.A.	1	1	3	3	6	6
Spare	...	...	19	21	14	18
Total	38	39	110	115	196	206

The difference observable between Home Defence and Service Abroad in the foregoing table is again due to the fact that tents are carried in the latter case, and that, instead of having two four-horsed wagons for equipment and supplies as in Home Defence, one of these is used for equipment and reserve rations, while the other, with an additional pair of horses, is used for supplies only; there is also a small increase in the number of spare horses for Service Abroad.

The following Ammunition Columns will be mobilised on the Infantry Divisional Column Establishment for Home Defence:—

No. 5 Column at Caterham, 1st Division.
" 6 " Aldershot, 2nd "
" 7 " Caterham, 3rd "
" 9 " Warley, 4th "
" 10 " Tilbury, 5th "
" 11 " Colchester, 6th "
" 13 " Chatham, 7th "
" 14 " Chatham, 8th "
" 15 " Chatham, 9th "

Of the above, No. 6 Ammunition Column belongs to the 2nd Division for Home Defence, whlch is also the division selected for the Field Force for Service Abroad.

Nos. 13 and 14 also form the cadres on which the two sections of the Ammunition Park of the Field Force for Service Abroad will be formed.

The *Cavalry Division Ammunition Column*, as regards *personnel*, is almost the same as the Corps Troops Ammunition Column, so far as Service Abroad is concerned: the only difference being that in the former case there are 20 fewer drivers, 11 more riding, and 42 less draught horses: the difference in the riding horses is accounted for by the fact that in the Cavalry Division Ammunition Column three shoeing-smiths are mounted, as against one shoeing-smith mounted in the Corps Troops Ammunition Column; in addition to this, the whole of the Corporals and Bombardiers (6 of each rank) are mounted, instead of only half the number as in the case of the Corps Troops Ammunition Column; there are also three *spare* riding horses in the Cavalry Division Ammunition Column.

The Field Army Establishments, Service Abroad, make no provision for a Cavalry *Brigade* Ammunition Column, and, on the other hand, the Field Army Establishments, Home Defence, make no provision for a Cavalry *Division* Ammunition Column.

As the formation of a Cavalry Division is a not very probable contingency, and no ammunition columns are actually allotted on the Home Defence Mobilisation Tables to provide the cadres for such columns for service abroad, it will not be necessary to enter into any further details in connection therewith; and we will proceed to examine the constitution of the Cavalry Brigade Ammunition Columns for Home Defence,

A Cavalry Brigade Ammunition Column.

Ranks.	"Personnel."						Horses.		
	Officers.	Warrant Officers, Staff-Sergeants, and Sergeants.	Artificers.	Trumpeters.	Rank and file.	Total.	Private or provided under Allowance Regulations.	Public.	
								Riding.	Draught.
Major	1	...	...	...	...	... 3	1	1	...
Lieutenants	2	...	...	...	...	...	...	2	...
Sergt.-Major (W.O.)	...	1	...	...	...	1	...	1	...
Batty.-Sergt.-Major	...	1	...	...	...		...	1	...
Batty.-Q.-M.-S.	...	1	...	...	...	7	...	1	...
Sergeant-Farrier	...	1	...	...	...		...	1	...
Sergeants	...	4	...	...	...		...	4	...
Shoeing-Smiths	...	...	3	...	...		...	1	...
Collar-Makers	...	...	2	...	...	7	...	...	...
Wheelers	...	...	2	...	...		...	...	...
Trumpeters	...	...	...	2	...	2	...	2	...
Corporals	...	...	...	...	4		...	4	...
Bombardiers	...	...	...	...	4		...		
Gunners	...	...	...	...	28	87	...	...	...
Drivers	...	...	...	...	51		...	...	74
Spare	...	...	...	...			...	3	8
Veterinary Officer (Attached)	1	...	...	...	...	1	2	...	...
Total	4	8	7	2	87	108	3	21	82
	108						106		

and the modifications to be made therein for the 2nd Cavalry Brigade, if required to serve abroad with the Field Force for Service Abroad.

For Service Abroad there would be an addition of one gunner, five drivers, and ten draught horses.

The following table shows the transport for a Cavalry Brigade Ammunition Column :—

Transport Vehicles.	Number.		Drivers.		Draught Horses.	
	*H	*A	H.	A.	H.	A.
Carriages, Spare, Gun, with Limber, 12-pr.	1	1	2	2	4	4
Carts, Ammunition, Small-Arm	8	8	8	8	16	16
Wagons — Ammunition, with Limber, 12-pr....	6	6	18	18	36	36
Wagons — Ammunition and Store, R.A. — For Stores	1	1	3	3	6	6
Wagons — Ammunition and Store, R.A. — " Equipment and Supplies, or Reserve Rations	1	1	3	3	6	6
Wagons — Ammunition and Store, R.A. — " Supplies	...	...	...	...	...	...
Wagons — Ammunition and Store, R.A. — " Tents...	...	1	...	3	...	6
Wagons — Forge, with Limber, R.A.	1	1	3	3	6	6
Spare	...	...	14	16	8	12
	18	19	51	56	82	92

*H. signifies Home Defence. A. signifies Service Abroad.

The Ammunition Columns which are to be mobilised on the Cavalry Brigade Ammunition Column Establishment are :—

No. 1 Column at Aldershot, 1st Cavalry Brigade, Home Defence.
" 2 " " " 2nd " " " "
" 3 " " Dublin, 3rd " " " "
" 4 " " Weedon, 4th " " " "

Nos. 1 and 2 columns furnish the cadres for the Ammunition Column of the 2nd Cavalry Brigade (Home Defence) in the event of the brigade being required for Service Abroad with the Field Force.

Ammunition Park.

The Ammunition Park is only formed for Service Abroad; there is one per Army Corps, under the immediate command of a Lieut.-Colonel, who receives orders direct from the Officer Commanding Royal Artillery on the Army Corps Staff.

The staff of an Ammunition Park is as follows :—

Ranks.	"Personnel."				Horses.		
	Officers.	Staff-Sergeant (Clerk).	Rank and file.	Total.	Private or provided under Allowance Regulations.	Public. Riding.	Public. Draught.
Lieut.-Colonel	1	1	2	...	2	...	...
Adjutant, R.A.	1	...	1	...	...	1	...
*Medical Officer	1	...	...	9	1	...	...
*Veterinary Officers	2	...	...	...	2	...	...
Driver	...	...	1	1	...	...	2
Total	5	1	4	10	5	1	2
	10				8		

*The Medical and Veterinary Officers are, for purposes of transport and supply, attached to such sections of the Park as the Officer Commanding may direct: servants are provided for them by the sections.

An Ammunition Park consists of five sections, one for each Infantry Division, one for Corps Troops, and one for Cavalry Division, each working in conjunction with the respective Ammunition Columns.

"Personnel" and Horses of Ammunition Park.

| "Personnel" | | |

Transport of an Ammunition Park.

Vehicles.	Number.			Drivers.			Draught Horses.		
Number of Section....	1, 2 or 3.	4.	5.	1, 2 or 3.	4.	5.	1, 2 or 3.	4.	5.
Wagons — Ammunition and Store, R.A. — For Gun Ammunition	9	15	6	63	51	33	126	102	66
Wagons — Ammunition and Store, R.A. — „ Small-Arm „	12	2	5						
Wagons — Ammunition and Store, R.A. — „ Stores...	1	1	1	3	3	3	6	6	6
Wagons — Ammunition and Store, R.A. — „ Equipment & Reserve Rations	1	1	1	2	2	2	4	4	4
Wagons — Ammunition and Store, R.A. — „ Supplies	1	1	1	2	2	2	4	4	4
Wagons — Ammunition and Store, R.A. — „ Tents...	1	1	1	2	2	2	4	4	4
Wagons — Forge, with Limber, R.A.	1	1	1	3	3	3	6	6	6
Spare	...	...	...	16	15	15	14	10	10
Total	26	22	16	91	78	60	164	136	100

Two sections of an Ammunition Park are included among the "Extra units to accompany the Field Force" for Service Abroad. No. 1 Section will be formed on the cadre of No. 13 Ammunition Column (Home Defence), which mobilises at Chatham, and No. 2 Section will be formed on the cadre of No. 14 Ammunition Column (Home Defence), which also mobilises at Chatham.

No. 1 Section (Service Abroad) carries the second supply of ammunition for the Infantry Division and extra units, and No. 2 Section carries the second supply for the Cavalry Brigade. The establishments given above would evidently require modification to meet the requirements of the specially constituted "Field Force for Service Abroad."

CHAPTER V.

Garrison Artillery.

The whole of the Garrison Artillery—Regulars, Militia, and Volunteers, with the exception of certain Volunteer Position batteries—are allotted for Local Defence, and dealt with in detail under the various Local Defence Schemes.

The present chapter will be devoted to the Garrison Artillery of the regular service.

Garrison Companies R.A.

The procedure on mobilisation for Garrison companies will be the same, as regards Reservists joining, and their being equipped with personal outfit, as for batteries of Horse or Field Artillery. In almost all cases, however, Garrison Companies are quartered in the fortresses, or, at all events, in the districts to which they are allotted on mobilisation; and will draw from local stores any camp or barrack equipment required by them on mobilisation: the actual details are worked out under the orders of the C.R.A. in each district, and embodied in the Defence Scheme for the district, and will be dealt with under the heading of Defence Schemes in a subsequent chapter.

Establishments.

Garrison Companies and District Establishments are maintained

(nominally) at war strength in peace time, there is, therefore, comparatively little change or increase in the *personnel* on mobilisation. Provision has to be made, however, for certain emergent detachments to reinforce Colonial garrisons at Malta and Gibraltar, and as it is considered advisable to form these emergent detachments solely from men actually serving, a corresponding number of Reservists must be called up to replace them in the companies at home, from which they are drawn.

The Mobilisation Regulations, Appendix H., gives the detail of allotment of companies to districts at home, distinguishing by the letters G. and M. respectively the companies from which emergent detachments are to be found, and giving the total complement to be provided for Gibraltar and Malta respectively: the Deputy-Adjutant-General, R.A. notifies to the C.R.A. in each district the proportion of the complement which he will be required to furnish from the companies specified under his command. The N.-C.O's. and men who form the emergent detachments will take with them their arms and accoutrements, a corresponding supply being kept in Ordnance Store charge for the Reservists who will fill their places.

Reserve Equipment.

A further supply of arms and accoutrements for any Reservists, surplus to establishment, is kept by the Ordnance Store Department at the head-quarters of each Garrison Artillery Division. It is desirable that arrangements should be made in each district for the periodical inspection of this Mobilisation Equipment: this, though not actually provided for in the Equipment Regulations, can easily be arranged locally, by obtaining the concurrence of the Senior Ordnance Store Officer, and the sanction or orders of the General Officer Commanding the district.

The following table shows the proportion in which mobilisation arms and accoutrements are kept up at the head-quarters of each Garrison Artillery Division[1]:—

Articles.		Devonport.	Dover.	Portsmouth.	Totals.
Carbines.	Martini-Metford, Artillery	500	550	650	1700
	Guards, hand, leather	500	550	650	1700
	Protectors, front sight, M.M.	500	550	650	1700
	Pull-throughs	500	550	650	1700
Sword-bayonets, 1888		500	550	650	1700
Scabbards, sword-bayonet, 1888		500	550	650	1700
Accoutrements.					
Belts, waist, buff, V.E. 1888, G.S.		500	550	650	1700
Bottles, water, enamelled		500	550	650	1700
Braces, buff, V.E. 1888	left	500	550	650	1700
	right	500	550	650	1700
Frogs, buff, bayonet, G.S.		500	550	650	1700
Pouches, Ammunition, buff, V.E. 1888: ·303", 50 rounds		500	550	650	1700
Slings, carbine, buff, artillery		500	550	650	1700
Straps, buff.	V.E. pattern, Great coat	1000	1100	1300	3400
	1888, Mess tin	500	550	650	1700
	Water bottle	500	550	650	1700
Valises, pattern 1888, G.S.		500	550	650	1700

[1] Since writing the foregoing, the arrangements as regards Gibraltar have been cancelled by H.G. W.O. letter $\frac{401/6}{40/7}$ | dated 18.6.94, consequent on recent increase in the strength of the artillery garrison at that station.

Ammunition and Stores.

The whole of the ammunition for guns mounted in works of defence (viz., 100 rounds per gun at home, and 200 abroad, except 13·5″ B.L., of which only 100 rounds are maintained) is on charge of the Royal Artillery, and stored in the works to which it belongs, with some few exceptions.

Tubes and fuzes are kept equally divided between the Royal Artillery and Ordnance Store Department, except at Gibraltar, where the whole of them are on Royal Artillery charge.[1]

Duplicate lists of these tubes and fuzes should be kept up in each Royal Artillery District and Senior Ordnance Store Officer's office, and compared periodically. These lists should also form appendices to the Royal Artillery and Ordnance Store Department sections of the Defence Scheme of the District.

The movable armament of fortresses also has 100 rounds per gun on Royal Artillery charge.[2]

Siege Companies.

The Siege companies at Dover, Gosport, and Devonport are allotted for local defence for Home Service: these companies form the nucleus of a Siege Train, and hold on their charge—

One 8″ R.M.L. howitzer.
,, 6·6″ ,, ,,
,, 40-pr.
,, 25-pr.

together with the necessary stores and vehicles, as laid down in the Equipment Regulations, and are distributed between the different divisions of the Siege Train (for Service Abroad) according to the nature of the ordnance.[3]

The allotment of the companies to form Siege Train Divisions is not published; it would naturally vary from year to year as the companies undergo the course at Lydd.

Ammunition for Siege Companies.

The ammunition for the ordnance on charge of Siege companies consists of—

100 rounds per piece on company charge (filled).
100 ,, ,, ,, Ordnance Store charge (empty).

Personnel.

The allotment of the *personnel* of Siege companies for Home Defence is usually made in the Artillery Mobilisation Tables of the local Defence Scheme, so as to give such companies charge of movable armament and armament on land fronts generally.

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[1] Equipment Regulations. Part II., Section XII., para. 78.

[2] 150 rounds per gun are to be at once demanded from Woolwich on mobilisation, as a reserve, in addition to the 100 rounds already on Royal Artillery charge.
For 3-prs. and 6-prs. quick-firing guns, 500 rounds are maintained on R.A. charge.

[3] Horse Guards' W.O. letter 57 | Dover | 2631, dated 5.7.93.

CHAPTER VI.

Militia Artillery.

The mobilisation of the Militia is a very simple matter, and is practically rehearsed every year when a regiment is called up for training. The procedure is as follows:—

The Adjutant of the regiment sends Army Form E.531 to each Militiaman and Militia Reservist; this is the notice to join at a certain time and place, and is applicable either to preliminary or annual training, or mobilisation. In addition to the above, notices are sent to the police, post offices, &c.

The Militiaman (or Reservist), on receipt of the notice paper (Army Form E. 531), may return it to the Adjutant with a request for a railway warrant, or may obtain such warrant from the officer nearest to his place of residence, entitled to issue warrants, on production of the notice paper. The Militiaman (or Reservist) may obtain a railway ticket at Government rate on payment, in exchange for the coupon at the bottom of the notice paper, on application to the Booking Clerk at any Railway Station; the money so expended is refunded to the man on joining.

The Militiaman is clothed on joining, his plain clothes being stored and returned to him on the completion of his training or period of service for which called out. If a Reservist is transferred to a regular unit, he takes his Militia regimental clothing with him.

Regiments of Artillery Militia are allotted to districts for local defence in Appendix L. of the Mobilisation Regulations: in the most important districts the local force is supplemented by the addition of regiments from other districts on mobilisation, and such regiments are periodically trained in the district and at the works to which they are allotted on mobilisation.

Mobilisation Equipment.

The following mobilisation equipment is kept at the head-quarters of each Militia Artillery unit, on charge of the Officer Commanding the unit:—

Martini-Henry	Guards, hand, carbine	1	per carbine.
	Springs, main	3	,, company.
	Strikers, rifle, Mark III.	1	,, carbine.
Pistols, Webley		1	,, Staff-Sergt.
,, ,, rods, cleaning, L.S.		1	,, pistol.
Bottles, water		1	,, man all ranks.
Carriages, or straps, water bottle		1	,, water bottle.
Cases, brown, pistol, L.S.		1	,, pistol.
Lanyards, pistol		1	,, pistol.
Pouches, ammunition, brown, pistol, infantry ...		1	,, pistol.

The further stores required by the unit, namely, camp equipment, stretcher, and ammunition, are held at the garrison to which it is allotted, and will be issued to the unit on its arrival there, as required, under the provisions of the local Defence Scheme.

CHAPTER VII.

Volunteer Artillery.—Constitution.

The Volunteer Artillery consists principally of mixed corps, that is

to say, corps in which there is a proportion of Position Batteries and a proportion of Garrison Companies.

As a natural result, it will be found that on mobilisation the Position Batteries are generally separated from the rest of the corps, and in the majority of cases are called upon to serve outside the districts to which they belong; the Garrison Companies will also, in many cases, be separated from corps head-quarters; it is therefore a matter of importance in peace time, to carefully preserve the Battery or Company organisation for administrative purposes.

Liability to Serve.

Volunteers cannot be called out except in the case of actual or apprehended invasion of any part of the United Kingdom; the occasion must first be communicated to both Houses of Parliament, if sitting, or declared in council and notified by proclamation, if Parliament is not sitting.[1]

Volunteers, when called out for actual military service are, in all respects, on the same footing as Regulars with regard to their obligation to serve wherever they may be required, in Great Britain, under pain of being deemed in a state of desertion.

Pay, Allowances, Discipline, &c.

As regards pay, allowances, discipline, &c., mobilisation places the Volunteers on the same footing as the Regulars.[2]

Separation Allowance.

Separation Allowance[3] is issuable to every married Volunteer at the following rates, when called out on mobilisation:—8d. a day for the wife; 2d. a day for each girl under 16, or boy under 14 years of age.

Equipment, Ammunition and Clothing.

In addition to the arms and ammunition supplied by Government, and to the uniform found by the corps, the equipment of a Volunteer is divided under three heads:—[4]

1. The minimum equipment necessary to enable him to take the field, viz.:—Accoutrements complete, including pouches to carry 70 rounds of ammunition; great-coat, haversack, water-bottle, mess-tin.
2. Additional articles which would be purchased out of the £2 2s. issued to the Commanding Officer of every Volunteer corps, for every efficient Volunteer in his corps. These consist of second pair of boots, knife and lanyard, blanket, valise. In many corps the majority of these articles have already been provided; Commanding Officers are, however, required to make their own arrangements to ensure every man being in possession of them on mobilisation, and it is to be clearly understood that they cannot be provided from Government stores.

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[1] "Volunteer Act, 1863." Section 17.

[2] "Volunteer Act, 1863." Section 17.

[3] "Allowance Regulations," para. 94.

[4] H.G., W.O. Memo. | V | General No. 358 | dated 27.5.89.

3. Articles of camp equipment and technical stores, which would be issued to the corps from Government stores at the place of concentration.

Mobilisation Orders.

In every corps the standing orders should provide for the assembly of the 1st relief at the corps head-quarters, and for the assembly of the Position Batteries as may be most convenient; for the provision and inspection of the necessary equipment, and the despatch of the 1st relief of the Garrison Companies, and of the Position Batteries, to the garrison or place of concentration to which they are allotted. It may be noted that the available strength of a Volunteer corps is computed at "the total number of efficients, less 10 per cent. for casualties." [1]

In practice, it will generally be found possible to arrange for the partial or complete relief of the whole complement required from any one corps of Volunteer Artillery within the corps itself.

The circumstances of different corps vary so considerably that it would scarcely be advisable to attempt to lay down any hard and fast rules, as these can be better conceived to meet the peculiarities of each individual case. It is, however, desirable to insist on the necessity for Adjutants of Volunteer corps to think out the subject thoroughly, and satisfy themselves that every detail has been provided for in peace time, and nothing left to be improvised on mobilisation.

The points to be attended to are chiefly:

(*a*) The allotment of every officer and man to a definite place or duty.

(*b*) The standing orders for the assembly of the companies or batteries.

(*c*) The machinery for promulgating the order to mobilise to all concerned.

(*d*) The standing orders regarding the clothing and equipment which each officer and man is to bring with him, and the clothing and equipment which will be provided for him at the place of assembly.

(*e*) The arrangements for the medical inspection of every officer and man.

(*f*) The arrangements for sleeping accommodation and rationing during assembly, prior to moving to the place of concentration or garrison.

Time taken to Mobilise.

It is considered that Volunteer corps should be ready to proceed to their place of concentration or garrison within from 24 to 48 hours of the receipt of the order to mobilise; this order will usually be accompanied or followed by instructions as to subsequent concentration, together with a route for the journey.

Position Batteries.

Position Batteries allotted to positions around London have 50 rounds per gun on charge, while Batteries allotted to local defence have, in

[1] "Confidential Mobilisation Tables for Home Defence (Garrisons)," para. 4 (c) of Instructions.

addition, a reserve of 100 rounds per gun on Ordnance Store charge. Each Battery consists of 4 guns and 2 wagons; and in the case of 40-pr. batteries 3 wagons.[1]

The Batteries are horsed under corps arrangements, and the provisional contracts for the supply of horses require careful revision annually in conjunction with the annual return of horses registered for army purposes by the Inspector General of Remounts, to ensure that no horses are counted upon for the Position Batteries which have been registered by their owners as available for other purposes. The Inspector General of Remounts furnishes annually, to General Officers Commanding Districts, that portion of the return which affects each district, thus enabling local Defence Committees to eliminate any horses required for the Field Army from their calculations in providing local transport.

Single Guns of Position.

There are, in addition, a considerable number of 40-pr. R.B.L. guns on Volunteer charge, used for drill and practice purposes, which are utilised in local Defence Schemes; these guns are used as single guns of position or movable armament; their stations on mobilisation are given in the Artillery Mobilisation Tables in the local Defence Schemes; and the Volunteers are required to undertake their transport to the places appointed, together with the ammunition on corps charge, the provision of the necessary gun detachments, and the service of the guns generally. The ammunition consists of 50 rounds per gun (filled) on corps charge, and 100 rounds per gun (filled) on Ordnance Store charge. The reserve ammunition on Ordnance Store charge being held in the locality where the guns are to be employed, it may happen that the ammunition on corps charge, as well as that on Ordnance Store charge, can be most conveniently kept by the Royal Artillery on behalf of the corps and Ordnance Store Department respectively.

It will be seen that in the case of the Position Batteries and the single guns of position several points have to be considered in the corps or company standing orders for mobilisation which do not occur in connection with the Garrison Companies, or companies which have no movable armament on charge which is utilised in the local Defence Scheme, such as :—

(*a*) Turn-over, care, packing, drawing and transport of ammunition.

(*b*) Horsing vehicles, and transport of guns and carriages by road or rail.

(*c*) Organisation of the administrative machinery for mobilising the batteries or guns, and bringing them to the place of concentration or garrison, &c., to which they are allotted.

Allotment.

The allotment of the Volunteer Artillery is given in Appendix L of the Regulations for Mobilisation (Home Defence).

Command on Mobilisation.

Units which leave their district on mobilisation, come under the

[1] H.G., W.O. letter | V. | Artillery General No. 3394 | dated 4.8.92.

orders of the officer into whose district or command they pass, from the time they leave their peace station or place of mobilisation.[1]

Units allotted to garrisons are already fully informed of the station to which they are required to proceed, the barracks or camp they will occupy, and the staff officer with whom they are to communicate, under the local Defence Schemes.

Units allotted to the Field Army will be informed on these points when they receive orders to mobilise, in the meantime (as regards Volunteer Batteries of Position) they are informed of the place to which they will be required to proceed on mobilisation, termed the "Place of Concentration."

CHAPTER VIII.

Defence Schemes.

It is not intended to go into the question of Defence Schemes in this chapter, any further than is necessary to explain the manner in which guns and *personnel* of the artillery are dealt with for purposes of local defence.

Guns.

The guns to be considered may belong to any one of the following categories :—

(*a.*) Fortress guns mounted in fixed positions.
(*b.*) Movable armament of a fortress.
(*c.*) Siege Train Company equipment.
(*d.*) Single guns of position on Volunteer charge, available for the defence of localities.
(*e.*) Batteries of Position of Volunteer Corps.

The scheme of defence in each district provides for the suitable allotment of the guns in categories *b*, *c*, *d*, &c., as regards the positions in which they are to be employed.

Personnel.

The Artillery Mobilisation Tables for each district should further allot the *personnel* necessary for working the guns in all the foregoing categories.

Every officer concerned should be in possession of that portion of the tables which affects him, and also of the manning detail for the work of defence to which he is allotted.

The following typical table will explain what is required, the names and figures being imaginary.

In addition to a complete table, worked out on some such principle as follows, the allotment of the movable armament for the preliminary operations of the defence, the actual distribution of signallers, range-finders, &c., the allotment of the Regimental Staff Officers and officers who are to fill posts on the fighting artillery staff of the fortress, should all be clearly laid down in a tabulated form, so that there may be no doubt in the mind of any one as to the functions and responsibilities which will be vested in him on mobilisation.

[1] Mobilisation Regulations, Section X.

ARTILLERY MOBILISATION TABLES.

_____ District.

BY CORPS.

Name of Corps.	Hd.-Qrs.	Strength.	Work to which allotted.	Relief. 1st.	Relief. 2nd.	Relief. 3rd.	Total.	Remarks.
No. — Company R.A.	...	150	Fort X. (21).	18	...	...	18	D.R.F. by District Establishment.
			East Battery (43).	40	...	...	40	" " "
			Fort Y. (40).	40	40	...	80	Includes D.R.F. P.F. by District Establishment.
							138	
Blankshire Artillery (Militia).	...	530	Fort Y. (40).	...	...	40	40	Includes D.R.F. P.F. by District Establishment.
			West Battery (80).	77	80	80	237	D.R.F. 1st Relief, " " 2nd and 3rd included.
			North Lines (100).	100	100	...	200	Land front; two Reliefs only.
							477	
1st Wessex Volunteer Artillery.	...	300	Fort X. (21).	...	18	18	36	D.R.F. by District Establishment.
			East Battery (43).	...	40	40	80	" " "
			Fort Z. (45).	45	45	45	135	Includes D.R.F. P.F. by District Establishment.
							251	

BY WORKS.

Name of Work.	Relief.	Corps for Manning.	No. of D.R.F. Detachmts.	Corps for D.R.F.	Signallers or Telephonists
Fort X. (1—10" R.M.L.)	1st. / 2nd & 3rd.	No. — Compy. R.A. / Wessex V.A.	1 / 2	Dist. Estab. / " "	No. — Coy.
East Battery (2—9" R.M.L.)	1st. / 2nd & 3rd.	No. — Compy. R.A. / Wessex V.A.	1 / 2	" " / " "	WessexV.A.
Fort Y. (1—9·2" B.L.)	1st & 2nd. / 3rd.	No. — Compy. R.A. / Blankshire Arty.	2 / 1	No. — Coy. / Bl'nkshire Arty.	No. — Coy.
West Battery (4—10" R.M.L.)	1st. / 2nd & 3rd.	" " / " "	1 / 2	Dist. Estab. / Bl'nkshire Arty.	Bl'nkshire Arty.
North Lines (8—64-pr. R.M.L.)	1st & 2nd.	" "	...	...	
Fort Z. (2—9" R.M.L.)	1st, 2nd, & 3rd.	Wessex V.A.	3	WessexV.A.	WessexV.A.

In preparing tables of this nature there are a few guiding principles which must be common to all, the following may be suggested as the most important:—

I. Calculation of the number of reliefs which can be furnished from the *personnel* available. Works which are likely to sustain a prolonged attack on a sea front should, if possible, have three reliefs; since in the case of ship *versus* fort, the victory is likely to go to the side which can hit hardest without intermission for the greatest length of time, and in such an action the result is likely to be much more sudden and decisive, than would be the case in a land action. Reliefs should be maintained intact for administrative purposes, and assimilated as closely as possible to the existing organisation of the units which furnish them.

II. Sudden attacks are most to be feared on the sea front: a first relief for all sea front works should, therefore, be provided from the units which are usually on the spot, these units may be

(*a.*) Companies of Royal Artillery.

(*b.*) Volunteer Corps whose head-quarters are in the locality.

(*c.*) Militia Corps whose head-quarters are in the locality.

These three classes will usually be more or less immediately available in the order given, and should, therefore, be allotted as first reliefs to works in the relative order of importance of the works.

Second and third reliefs should be provided, so far as is consistent with the foregoing principles, from the same units which furnish the first relief; this course will, however, seldom be possible in the case of works manned by the R.A., and recourse should then be had to Militia and Volunteer Corps which come from a distance.

The Corps which come from a distance, after satisfying the above conditions, should then be allotted to works less liable to sudden attack, or to attack at an early stage of mobilisation.

III. Mixed detachments, or mixture of different units in the same work, is much to be deprecated; it is almost certain to involve administrative confusion and loss of fighting efficiency.

IV. Circumstances alter cases, but it may be accepted as an axiom, that the mobilisation tables should not merely be tables for war manning, but should equally be the basis of all peace manning for combined drills and practice. Officers of considerable experience have advocated two sets of tables, one for peace manning and the other for war manning; it is thought, however, that such an arrangement is open to serious objections, inasmuch as there must inevitably be a certain amount of dislocation in important administrative details, and a tendency to look upon the peace manning as the ever present reality, while the war manning is relegated to a secondary place and becomes an unfamiliar contingency. I once heard a very smart and capable officer remark that the arrangements he had made for a peace manning were perfect in every detail, and that it would be easy enough to *make-shift* for the war manning when the time came!

(Conclusion.)

A SCHEME FOR THE BETTER TRAINING OF THE VOLUNTEER ARTILLERY.

BY

CAPTAIN C. P. MARTEL, R.A.

I OFFER a few remarks on the subject of the training of the Volunteer Artillery, and a scheme for the division of the present Corps into two parts, a 1st and 2nd class, whereby a much higher efficiency would be obtained, and at the same time no fresh financial embarrassments would be created.

It will be necessary, first, to consider briefly what is the minimum that is expected, at the present time, of a Volunteer Artilleryman, in order that he may be considered an "efficient."

Put shortly, the terms of efficiency are:—

During the first and second year's service 30 drills, 20 being gun-drills.

During the third and fourth year's service 12 drills, 9 being gun-drills.

After this a man, having been returned four times as an efficient, need only do 9 gun-drills in each year. All drills are of one hour's duration.

Attendance at gun practice once a year is obligatory, also at the Annual Inspection unless leave of absence is obtained in writing from the Commanding Officer.

It should also be stated that in the second year, 12 gun-drills are considered sufficient, provided 60 drills, 40 being gun-drills, are done in the first two years combined; I draw particular attention to this latter condition, as it shows that it is considered that a man can retain all that is necessary of his drill and training after his first or recruit's year by doing 12 gun-drills in his second year, and afterwards 9 gun-drills each year.

In each Corps there will be men in all stages of service, varying from men under one year, to men having two, three, and perhaps as many as 20 years' service; but for the better training of the men, I would divide them into two classes, the 1st class consisting of all under four years' service, and also those who having more than four years' service elect to serve in this class; the 2nd class or reserve, to consist of the remainder of the men of over four years' service.

For purposes of instruction and drill men can be classified under four heads:

(1.) Recruits.

(2.) Men in their 2nd, 3rd, and 4th year's service.

(3.) Men of over four years' service.

(4.) Men who can and do attend very regularly and on nearly every drill night throughout the year.

It stands to reason, that there will be a great difference in the attainments of the men in these different classes; the "recruit" will have little or no knowledge; those in class (2), taken as a whole, will show a very fair knowledge, and probably are the most efficient men in the Corps, for if well grounded during the first two years, they should be well able to keep up their knowledge for a year or two, and pick up any alterations in the drill which may take place; men in class (3) of whom there would probably be a considerable number in every Corps, putting in nine or a few more than nine drills, unless specially considered on drill nights, can hardly be expected to be very perfect gunners, they will have partly forgotten what they learnt as recruits, many alterations in the drill will take place, which they have little time to learn, and also the energy they possessed and the anxiety they had, as recruits, to be smart gunners, will in many cases, have diminished considerably.

Class (4) consists of men of varied length of service and usually furnishes the gun-layers, signallers, dial numbers, and such specialists as the Volunteer Artillery may be expected to find, but for the best results to be obtained, these men should receive individual attention.

I might, perhaps, add a 5th class, viz., Officers and Sergeants, who, in my opinion, require every winter a special course of instruction, to keep their knowledge up to the standard required for "Proficiency."

It is clear, therefore, that men from these various classes cannot, with advantage, be drilled together, for if they are, there can be little systematic training, and no graduated course of instruction; but how is this to be avoided? It seems almost impossible. As a rule, there is but one Sergt.-Instructor of the permanent staff, available for drill, and perhaps a Volunteer Sergeant, who may be a man well up in his work, but who can hardly be looked upon as an Instructor in the same sense as a member of the permanent staff. To tell off different drill nights to the various classes is, in my opinion, impossible, the night that suits one man is the night on which another cannot attend, and so on; it is sometimes an advantage to have a separate drill night for recruits, but even then they can hardly be prohibited from attending on other drill nights: and supposing that there was no dearth of Instructors, it is not likely that there would be enough men in each class to enable them to form separate drill squads.

In general then, I think we find that the majority of the men are drilled together, irrespective of their knowledge, some being hurried along and obtaining a very imperfect knowledge of elementary details, and others never getting beyond a certain point, thereby becoming discouraged and disheartened.

It must not be forgotten, that besides the gun and repository drill and gunnery instruction generally, there are also squad, company, and carbine drill, and a few battalion movements to be learnt, besides many other details which take up endless time.

The result of this species of training is, that we obtain a large body of men with a general, but elementary knowledge of their work, having obtained an insight into the drill of two or three natures of ordnance, but requiring a great deal of instruction before they could work side by side with the Royal Artillery, or be expected by themselves, to successfully defend a portion of the coast.

Possibly some years ago this general knowledge was all that was required, when there was no organised method of coast defence, hardly such a term as "Fire Discipline," when there were no special duties told off to officers, when the drill of a single gun in the drill hall was pretty well all that the men need learn, and when men practised leisurely at a standing target; but now much greater perfection in every branch of the drill has to be attained, a system of fire control, and all the various details connected therewith, has to be mastered, and a considerable knowledge of Part VI. "Garrison Artillery Drill," which comprises 107 pages, must be acquired.

A little study of the results of the practice at Shoeburyness, last year, during the meeting of the National Artillery Association, by detachments from all parts of England shows, I think, that there is room for improvement in the training of the Volunteer Artillery.

Take, for instance, No. 2 Garrison Artillery Competition, which consisted in group firing with the 64-pr. on traversing slides, at a target moving obliquely across the front of the battery between two known ranges; I consider this was practice at a moving target under very favourable conditions, and yet out of 170 shots fired only 14 are recorded as hits, and 4 as ricochet hits. Again, compare the practice of the Volunteer Artillery with the 9-inch gun, at standing targets, on measured ranges, with that of the detachments composed of R.A. and R.M.A., both as regards accuracy and time; the former fired three rounds per detachment and only one obtained three direct hits, a considerable number never hitting the target at all, while the latter fired altogether 38 shots and of these 31 were direct and five ricochet hits, only two missing the target; and as regards time, the Volunteer Artillery took longer to get off three rounds with the 9-inch, than the service detachments did to fire five rounds with the 10-inch.

What chance have the majority of Volunteer Artillery of obtaining the improved training, which has been rendered necessary in consequence of this complete revolution in the drill and method of fighting a modern fort? It seems to me they have little chance of getting beyond an elementary knowledge, and that if they are to be expected to take up the duty of defending a portion of the coast line, at a moment's notice, when occasion may require, their present instruction would have to be greatly augmented, or else, what I consider a far better plan, the present Corps should be divided up into two portions, one portion consisting of the men in the 1st class, and the other of those in the "reserve" or 2nd class.

The object of this organisation is, to obtain in the 1st class, a body of thoroughly trained men, and in the 2nd class, a large number of men possessing a general knowledge, which could, when occasion arose, be turned to account by the aid of the necessary instruction.

I will now touch on a few points which follow from the division of the Corps, and on the organisation and training of the 2nd class:—

(*a.*) All men on joining a Corps originally, to be enrolled for four years, under the usual conditions, after this time men would be permitted either to resign, join the 2nd class, or remain in the first class.

(*b.*) Drills during the first four years to remain as at present, except, that in the second year 20 gun-drills to be obligatory, after the fourth year, men desiring to remain in the 1st class to agree to put in 20 drills each year.

The following apply to men of the 2nd class :—

(*c.*) They would be required to put in three drills a year, of one hour's duration each, these drills to be on consecutive days. To enable this to be done I would set apart three days, three times a year, on which the drills could be carried out in the halls, at all hours convenient for the men, days and hours being chosen by the Corps.

(*d.*) Gun practice would not be obligatory.

(*e.*) They would be permitted to attend "Camp" and "Heavy gun-drill at works of defence," under the same conditions as men of the 1st class; those putting in six days drill in either case, being exempt from further training for the year.

(*f.*) They would not attend the Annual Inspection.

(*g.*) They would remain attached to the companies to which they belonged during their fourth year, there being no limit to the number of men so attached.

(*h.*) They would retain the same rank as they had when in the 1st class.

(*i.*) Clothing would be issued to them, with some distinguishing mark, on the shoulder straps or otherwise.

(*j.*) Their arms would be kept in the armoury and only issued to them for camps or on similar occasions.

(*k.*) They would be permitted, as members of the Corps, to use the drill halls, mens' room, gymnasium, belonging to the Corps, etc. (in fact they should be made to feel that they belong to the Corps just as much as when in the 1st class).

Regulations bearing on many other details would naturally be required, but the above are sufficient to show the main idea of the scheme.

To retain the capitation grant, at about the same figure as it is at present, I would increase it to £2 per efficient for men of the 1st class, and reduce it to £1 for men in the 2nd, this at first sight appears to be a reduction, but I think, though I have no means of ascertaining with accuracy, that if the present Corps were divided, as they stand, into

1st and 2nd class, the former would outnumber the latter; but in any case the grant could easily be fixed, so as not to create any new financial difficulties for the various Corps.

With regard to the travelling allowances of the 1st class for gun practice, I would grant this allowance for the actual number of men who attended, not limiting it to one attendance per man, as at present, this would not cause any extra expense, as there would not be any allowance required for the 2nd class.

For this division into 1st and 2nd class I claim the following advantages :—

(*a.*) It would draw a distinct line between the men thoroughly trained, and who could be depended upon, at a moment's notice, to take up their position and work the guns of a fortress according to modern ideas, and those who would require considerable instruction at a time when it would be least convenient to impart it.

(*b.*) The 1st class would consist of a body of men, whose training would be considerably above the average of the present Volunteer Artilleryman, for several reasons (1) They would have to put in an increased number of drills. (2) Being fewer in number they could receive more attention from the permanent staff. (3) Being a body of men whose attainments were about on a level, their instruction could be more progressive.

(*c.*) The men of the 2nd class, although only doing three drills a year, would be quite as useful a body of men, as a very large number of those, who at present put in nine drills a year. The drills being on consecutive nights, they would learn as much as is at present learnt in nine drills spread over a whole year.

(*d.*) The formation of a 2nd class would probably retain a number of men, who resign because they find it inconvenient to attend the inspection, or gun practice, or who find that, from various causes, they cannot any longer afford the time, which is necessary to keep them thoroughly up to their work, and who do not care to be thought less efficient than formerly.

(*e.*) With regard to those Corps, who receive travelling allowance for gun practice, by allowing men of the 1st class to attend as often as they could, instead of once a year, as at present, a great advantage would be gained, for where can men learn their work better than at actual practice, especially if they have the advantage, as some have, of carrying it out from forts armed with heavy ordnance, and supplied with modern appliances.

The above remarks are written with reference to Corps of Garrison Artillery, especially those told off to important defences, as I know little of the Position Batteries; I am aware that some Corps have a much larger proportion of outlying companies than others, and, in my opinion, these outlying companies have an advantage in training, in that there is usually an Instructor for each outlying company, who is

thoroughly in touch with the men, against this must be placed the disadvantage of having, as a rule, only one gun to drill at.

In Corps with extensive head-quarters, where there are several guns for drill purposes, men of outlying companies can occasionally be brought in, to enable them to practice the more advanced portions of the drill, but this has to be done entirely at the expense of the Corps concerned.

There are so many ways in which Volunteer Corps differ from one another, some having advantages in training which are denied to others, some having men of quite a different stamp to others, etc., that it is very difficult to formulate any scheme which will be generally applicable to all, but in all cases I think that the division into 1st and 2nd class would be a distinct advantage.

In conclusion, I would point out that this is merely the general idea of a scheme which probably has many disadvantages, but I hope that it may be of interest to any who think as I do "that there is necessity for improvement in the training of the Garrison branch of the Volunteer Artillery, if it is to be expected immediately on mobilisation to take its part in the defence of a 1st class fortress."

STABLE MANAGEMENT.

BY

VETERINARY LIEUT.-COLONEL W. B. WALTERS, C.B., F.R.C.V.S., *late* A.V.D.

(A Lecture delivered at the Royal Artillery Institution, Woolwich, 12th February, 1894).

COLONEL W. S. CURZON, R.A., IN THE CHAIR.

THE CHAIRMAN—Gentlemen, I do not think I need introduce Colonel Walters to you for you all know him. He has very kindly come to talk to us this evening about the care of our horses, and I wish he had a better audience.

VETERINARY LIEUT.-COLONEL W. B. WALTERS—Colonel Curzon and gentlemen, in considering the subject of stable management I do not propose to deal with structural details, except in so far as the principles of ventilation, light, and drainage are concerned; for, in the first place, the time at my disposal will not admit of it, and, secondly, from a military point of view it is unnecessary. It may be well, however, to remark that as horses thrive best in a dry atmosphere: all stables should be built so as to resist the invasion of damp as much as possible; and for this reason whatever the situation, aspect, or nature of the soil may be, it is all-important that the foundations should be so laid that the ascent of moisture from the earth through the walls, by the process of capillary attraction, is impossible. When moisture is seen trickling down a stable wall we may safely conclude that the foundations are not damp proof, and, although the system of drainage may be perfect and the arrangements for ventilation all that can be desired, considerable difficulty will be experienced in keeping such a building in a satisfactory sanitary condition.

One of the most important items in stable management is that of ventilation. The horse, perhaps more than any other of the lower animals, requires a constant supply of pure air to keep him in a proper state of health. Oxygen is the great blood purifier, and if this gas be not present in sufficient quantities unhealthy conditions will be developed, and probably the animal's life endangered. Roughly speaking, the atmosphere is composed of four-fifths of nitrogen and one-fifth of

oxygen, with about three to six measures in 10,000 of carbonic acid and a trace of ammonia. The object to be attained in ventilating a stable is to ensure the admission of as much fresh air as possible, to avoid draught, and to secure adequate means of exit for the foul air. In all properly constructed modern troop stables these requirements are provided for, and as an example we cannot do better than describe the ventilating arrangements of the new Army Service Corps stables in this garrison. I think the cubic space per horse allowed in one of these stables is something like 1500 feet. Under each bail, and about a foot from the floor, a perforated iron grating communicates with an air shaft running along the whole length of the building, within the walls, on each side. Fresh air is admitted by the means of similar gratings placed somewhat higher up on the outside, and by this arrangement a direct draught upon the horses is avoided. Above the windows a similar air shaft is constructed opening into the stable by a narrow line of continuous grating, while an open roof with louvre boards at its ridge affords a ready means of exit for the foul air. The principal gases generated in a stable are :—Carbonic acid, sulphuretted hydrogen and ammonia; these, together with some other gases, constitute the foul air of a stable. Although many gaseous fluids, notably carbonic acid, are, at a low temperature, much heavier than ordinary atmospheric air, they expand rapidly under the influence of heat and readily become diffused. Under these conditions the foul air of a stable is lighter than pure air, of a lower temperature, and consequently ascends, being replaced by fresh air from below. It will be readily understood that if ample means are not provided for the exit of the foul air at the upper part of the building, it must of necessity, as it cools, descend to be again respired. Such a stable as I have described can be kept in a satisfactory sanitary condition even although the windows and doors may all be closed, provided the ventilators work fairly smoothly. It is not so, however, in many of the old-fashioned stables with which most of us are familiar. It will be within your recollection that in many of the country quarters in the United Kingdom, especially in Ireland, the ventilating arrangements of the stables are very imperfect. We frequently meet with stables with men's rooms above and each stable accommodating 8 or 12 horses only. In such a case the best method of allowing foul air to escape is by means of air shafts through the rooms above and opening at the roof by means of the louvre-board arrangement. This is, however, not always practicable, and we have to depend upon the windows, the fan-lights over the doors, and sundry perforated air-bricks or gratings under the eaves of the roof for the exit of the foul air. Fresh air is admitted by means of the drain holes, spaces under the doors, air-bricks, &c. Although such means of ventilation are remarkably rough, yet at the same time we find that with care we can keep these stables in a fairly satisfactory sanitary condition. Of course, great care is necessary in order to secure something like a uniform temperature; all stuffiness should be avoided, and for this purpose, although during very cold and inclement weather it is advisable to keep the windows closed on the windward side, the opposite windows should be kept partially open, and the function of the air-bricks

or gratings should not be interfered with, as they sometimes are, by blocking them up with straw or litter. In order to ensure uniformity, all stables should be ventilated under the direction of a responsible officer. Such buildings as I have just described are, of course, much more difficult to ventilate on account of their defective construction, but by the establishment of a definite system a satisfactory result can be obtained with very little trouble.

The opinions of practical horsemen as to the temperature which is best calculated to keep horses in health and vigour differ very considerably. The majority, of whom I confess myself to be one, are in favour of warm stables. The horse, like the human being, can better endure hardships and privations when in vigorous health and hard condition; and to perfect this he requires to be housed in a moderately warm, dry, and well-ventilated stable, free from draughts. The idea that by exposing horses to a cold temperature in stables they are better able to endure hardships is unreasonable, and is not borne out by facts. I have, however, heard this theory advanced by some very practical horsemen, and have also seen it in actual practice. When I was in Aldershot some six or seven years ago, I remember one instance in particular in which the doors and windows of the stables occupied by a cavalry regiment quartered in the South Cavalry Barracks were kept open day and night throughout a severe winter. I inspected this regiment frequently, because I was anxious to see the result, and therefore I did not in any way interfere with the arrangement of the ventilation. To my surprise, during the whole of this period the regiment had fewer horses on the sick list than any other in Aldershot; in fact there was no sickness whatever which could be traced to exposure, and, with the exception of the horses being somewhat rough in their coats, they were healthy and in good hard-working condition. I merely mention this as a fact, and by no means in support of the theory, as I have very frequently seen much harm result to horses from exposure under similar conditions. On the other hand, hunters, chargers, and harness horses are generally housed in warm and comfortable stables, and, as a rule, are clipped in the winter. These animals are frequently exposed to very inclement weather without suffering to any appreciable extent. These remarks appear to be somewhat contradictory, but I think they tend to prove that the question is merely one of habit and custom. I must say that I prefer a warm stable, provided that it is perfectly fresh and well ventilated. It must be understood that in advocating warm stables I do not imply that they should be unduly hot. The effects of a hot stable upon the horse are said by the advocates of a high temperature to be the production of a glossy coat, and a disposition to accumulate flesh; but to this we may also add an extreme susceptibility to the influence of cold. Moreover, a hot stable, unless it is artificially heated, generally means a foul one, and the temperature is maintained at the expense of fresh air. This state of things is highly prejudicial to health, and certainly is conducive to the reception of disease. With good stable management, ventilation, and cleanliness I think a temperature of 55 degrees is sufficient to meet all requirements.

The subject of drainage can be dismissed with a very few remarks, as it more properly comes under the head of stable construction. In military stables the system of surface drainage is generally adopted, and this method is, in my opinion, by far the best. I consider that all sunk stall drains in a stable are an abomination; the traps frequently get out of order, the gratings become choked or broken, and the accumulation of foul matter in the drain pits is a continual source of trouble. With granite or good concrete floors we can keep the surface drains in perfect order, and, providing that the main drain outside is at a proper distance from the stable and is well trapped, this system leaves nothing to be desired. Stables paved with the old-fashioned cobble stones still exist in some of our barracks, and these are very difficult to keep in a satisfactory sanitary condition. The paving soon becomes uneven, the stones get loose in the cement setting, and the earth becomes more or less saturated with urine and the fluid sweepings of the stable.

The stalls in troop stables are separated by bails, which should be hung rather low. If bails are placed too high, horses may frequently injure themselves seriously by kicking over them and being unable to release themselves. A vicious horse should always be placed in a corner stall and, if possible, with a spare stall between himself and his neighbour. A stout plank slung from a bail is a good remedy against injury by kicking.

The management of the bedding is an item of importance, but it is so thoroughly understood in the Army that I need only allude to it in order to mention one or two points. In many private stables it is the habit, especially in wet weather, for the groom to place the litter under the manger. This is a great mistake, because the gases given off from the more or less foul bedding are directly inhaled by the horse. Therefore, if there are no litter-sheds outside, the bedding should be stacked in the middle of the stable, or at all events in the rear of the horses instead of in front of them. In nearly all military stables litter-sheds are provided so that the soiled bedding can be removed from the stable and exposed to the air even in the most inclement weather.

In fine weather the litter should be frequently shaken up outside the stable, and the day's ration of fresh straw thoroughly mixed through it. By adopting this plan considerable waste will be avoided, and the horses will, to a certain extent, be prevented from eating the fresh straw. Bedding down at mid-day is a system adopted in some mounted corps, and, in my opinion, it is a very excellent one. Many horses will lie down during the afternoon if they are permitted to do so, and this short rest is a great boon to them, especially after a hard field-day.

I have heard this system objected to on account of the scarcity of bedding, but I know from experience that if the litter is well managed the allowance is sufficient for the purpose. As an illustration, I may mention that when I was in Dublin some years ago, two cavalry regiments were stationed in that garrison. One bedded down at mid-day, and the other at the evening stable hour, and I was surprised to find, at my inspections, that the bedding in the former regiment was actually more abundant than in the latter.

Horses should always be watered before and not immediately after

feeding, because the stomach of this animal is a small one and the water does not remain in it; it passes through into what is called the cœcum or water gut. Consequently if a horse is watered immediately after a feed of oats, the chances are that a considerable amount of the food will be carried by the water into the intestines, and the result will probably be irritation and derangement of those organs. Therefore water should always be given before feeding, and not immediately afterwards.

As regards the quality of the water, we are obliged, in the Army, to take what we can get. But I may mention that lake or river water is better than hard well water; the hardness of the water depends upon the amount of lime salts it contains, and unless a horse is accustomed to drink hard water a sudden change from soft to hard will often produce harshness of the coat and derangement of the digestive organs. I have seen this over and over again. I remember one instance in particular. On marching from one station in Ireland where the water was soft, to another where it was remarkably hard, the temporary loss of condition amongst our horses was most marked. Their coats became, in many instances, harsh and dry, and an unusual number of cases of colic occurred. I have no doubt that these symptoms were caused by the sudden change from soft to hard water. The horses soon became accustomed to the change and resumed their ordinary condition. I desire to impress upon you the necessity of allowing horses plenty of water. This may seem to be a simple thing, but in the course of many years' experience I have seen very serious consequences result from stinting horses drinking water. Insufficiency of water is a potent factor in the production of many ailments, and I cannot lay too much stress upon the necessity of preventing crowding at the water troughs and of giving the horses plenty of time to drink. Soldiers are very apt to hurry horses away from the troughs, especially in wet weather, and therefore I think it is absolutely necessary that a trustworthy non-commissioned officer should be stationed at every trough who should be held responsible that every horse is allowed sufficient time for drinking. It may seem an insignificant point, but I can assure you that I have seen a great deal of harm resulting from the neglect of it.

As regards forage, I have very little to say, because this subject comes naturally under the head of dietetics, and cannot be dealt with in detail in this lecture.

As you are aware, large quantities of foreign hay have been issued in this garrison during the last few months, and although it has hitherto been, as a rule, excellent as regards quality, it is generally of a hard and coarse nature, especially that imported from Canada and South America. A proportion of English hay should be mixed with this class of forage and, if very dry, it is a good plan to sprinkle it with water before it is placed in the racks. As foreign hay is generally supplied in bales bound with wire it is essential to take care that in chopping the wire none of the broken pieces remain in the hay. I have heard of fatal results from horses swallowing portions of the wire of baled hay, and therefore in opening the bales it is well to see that the wire is carefully cut and put on one side intact. As regards the oat

ration, it is an established custom now in the Army to mix a proportion of chaff with the grain, and to put each horse's feed separately in a small basket or measure, so that every horse may get his proper allowance. In some corps a small quantity of salt is mixed with each feed. I do not advocate this plan, for the reason that although salt is an excellent thing in its way and the majority of horses like it, yet some do not, and therefore I prefer the method of placing a lump of rock salt in each horse's manger, which he can lick or not at his pleasure. If rock cannot be procured, then ordinary salt may be given two or three times a week, which is quite enough.

Green food is an excellent article of diet, especially in the spring of the year, but it should be given with discrimination and sparingly at first, or it may be productive of intestinal irritation. Green forage should be well mixed with the hay ration before it is given. It is essential that green forage should be perfectly fresh, and all stale or withered samples should be at once rejected. Bran is an excellent article of diet. It is slightly laxative, and may be given in the form of warm or cold mashes once or twice a week. During the winter months carrots may be given with advantage. They should be well washed, and sliced lengthwise in order to prevent the possibility of choking.

The rack-chains should be removed from the head-collars as soon as possible after the horses have finished their feeds. This is especially necessary if the system of bedding down at mid-day is adopted.

Before proceeding to deal with the various points connected with the subject of grooming, it will be well to briefly describe the structure and functions of the skin. Besides serving as a protecting medium to the internal parts, the skin, being extremely sensitive, is the chief organ of the sense of touch. Also, as we shall presently see, it plays an important part in the function of excretion and secretion; it is largely concerned in regulating the temperature of the body by the amount of evaporation from its surface, and it also performs other functions. The skin consists of two layers, an external one, which is called the epidermis, cuticle, or scarf-skin, and an inner one called the dermis, corium, or true skin. The epidermis is the non-sensitive portion and merely consists of a number of cells, which are being continually multiplied and pushed to the surface, where they become flattened and hard, and are ultimately shed as scurf or dandriff which is, or should be, removed from the skin, together with the dust and dried perspiration, by the process of grooming. The epidermis protects the highly sensitive true skin beneath, and by its varying thickness modifies the sense of touch. The dermis or true skin consists of a dense network of connective tissue which is largely supplied with blood vessels, nerves, and absorbents. It rests upon a layer of fatty and cellular tissue in which are imbedded two important sets of glands. I want particularly to impress upon you the presence of these two sets of glands, because they play an important part in the animal economy; first of all we have the sweat glands, and, secondly, the sebaceous or oil glands. A gland is any organ of the body which extracts from the blood a special material for the purpose of secretion or excretion; for instance, the

liver is a gland, because it extracts from the blood the substances which form bile. The function of the sweat glands is to secrete perspiration, which is conveyed out of the body by means of ducts, which open upon the surface of the skin. These glands and ducts are very numerous; so much so that it has been estimated that on the palm of the human hand they amount to upwards of 3000 per square inch. Perspiration is always going on in a greater or lesser degree either in the sensible or insensible form, and, as a horse doing moderate work loses upwards of 14 lbs. weight of fluid by means of the skin, in 24 hours, and as this fluid contains a considerable proportion of the used up products of the system, it will be understood that a very large amount of the waste material of the body is excreted by means of the sweat glands. These glands are fully developed and very active in highly-fed, hard-worked, and well-nourished horses, and for this reason good grooming is an absolute necessity, because, if under these conditions the skin is not thoroughly cleaned, the ducts of these important glands may easily become clogged or choked. The sebaceous or oil glands are lodged in the dermis or true skin, and, like the sweat glands, are very numerous, being more so at such parts where there is much friction, such as the bend of the knees. They secrete an oily material which is discharged by means of their ducts either directly upon the surface of the skin or into the hair follicles or root sheaths. Each hair root is surrounded by a follicle into which is discharged the fluid from one or more of these oil glands, and it is the substance produced by them which lubricates the skin, and which gives that glossy coat and sleek appearance which is so often seen as the result of warmth and good grooming. A thorough and systematic course of grooming not only removes the dust scurf or worn-out cells of the epidermis and dried perspiration, but by friction these glands are stimulated to increased action, the so-called pores of the skin are kept open, and the coat is rendered smooth and glossy. The excretion of waste material by the skin, to which I have already alluded, is continually going on, both in a state of nature and domestication, but the full development of the functions of the skin is only produced by work, high feeding and good grooming. The arguments advanced by some people that because horses in a state of nature require no grooming, so horses in stables require merely sufficient to make them presentable and not for any healthy stimulus needed by the skin, is not tenable, as the conditions are entirely different. Horses at grass take but little exercise comparatively, their food is of a much more simple and laxative character, and as the waste products and the various excretions of the body are carried off mainly by the action of the bowels and kidneys, the glands of the skin are seldom overtaxed, and grooming is unnecessary for the maintenance of health. On the other hand, the stabled horse doing regular work, especially hard and fast work, must be fed upon highly nutritious food, and from this cause all the secretions of the skin are enormously increased, and unless nature is assisted by artificial means the pores of the skin will speedily become blocked, and the health of the animal will naturally deteriorate. It is not the fact of living under cover, but the actual work and feeding of the domesticated

horse which necessitates grooming. Troop horses in camp, for instance, require grooming quite as much as they do in barracks; but we know that it is often impossible to carry out this duty properly on active service in the field, and we also know that the result is the very considerable percentage of skin diseases which occur in every campaign. I do not wish it to be understood that insufficient grooming is the only factor in the production of skin diseases, but that it is one of the chief exciting causes cannot be denied.

The general process of grooming is so well understood in the Army that it is not necessary for me to enter minutely into all the details, but there are several important points which may be referred to with advantage. In the first place we frequently come across cases of neglect in picking out, washing, and drying the horse's feet thoroughly. This may seem a very unimportant matter, but in reality it is very highly important. I have known many instances where bad cases of thrush (disease of the frog) have occurred from neglecting this precaution. Therefore the feet ought to be picked out, washed, and then dried with a towel. Another point is the superficial polishing with the wisp or rubber and neglecting to use the brush properly. When horses return to the stables, especially after a hard field-day in hot weather, they are generally covered with dust and dried perspiration; and although they may have been walked quietly for last mile or so to barracks and allowed to cool down, they arrive in a condition which is very unpleasant to contemplate by the men who have to clean them. If, therefore, they merely get a superficial brushing and polishing with wisp and rubber, the skin is not properly cleaned and the pores are liable to become blocked. The brush should be carefully and well applied during the mid-day stable hour. The men have not time in the early morning to use the brush properly, and at the evening stable hour I am an advocate for a thorough damp wisping, and hand-rubbing to the legs.

It is an excellent plan to dress horses outside the stables on their return from drill or exercise, providing the weather is fine and warm, but on no account should this be permitted during the prevalence of cold winds. The process of grooming opens the pores of the skin, and animals accustomed to warm stables are, under these conditions, much more liable to take cold if they are unduly exposed to inclement weather. The advantage of grooming in the open air is that the horses' coats can be cleansed without filling the stables with clouds of dust.

The nostrils should be thoroughly cleansed as soon as possible after the horses return to stables, and also during each stable hour, for the presence of dust upon the delicate lining membrane of the nose is very irritating. This should be performed by turning up the wing of the nostril with the thumb and inserting a sponge well saturated with water. Men should be taught how to do this properly, and no non-commissioned officer should pass a horse without satisfying himself that the nostrils have been thoroughly sponged. A horse cannot breathe otherwise than through his nostrils, and therefore any accumulation of dust upon the membrane must cause him considerable inconvenience.

Another important point is the misdirected zeal which we often see in the use of the curry-comb to tender skinned horses ; the curry-comb should never be applied to the skin at all, but merely used to clean the brush.

The manes and tails should occasionally be well washed with soap and warm water, as it is very difficult to cleanse them thoroughly with the brush on account of the mass of thick coarse hair.

Horses under treatment in the infirmary stables frequently appear to be insufficiently groomed, but it must be remembered that there are very many cases of sickness which render the process of grooming absolutely impossible. No horse, however, should be returned to his troop stable from the sick lines in anything but a thoroughly clean condition.

The system of washing horses legs is discountenanced in the Army, and very rightly so, for unless the stable arrangements admit of their being thoroughly dried and warmly bandaged the wet and cold will probably produce irritation of the skin, and that troublesome affection cracked heels. In private stables, where labour and proper appliances are plentiful, the legs may be washed, but even in this case I do not recommend it. It is better to thoroughly rub the legs, up and down, with loose dry straw until the mud is removed and they are fairly dry. An old set of bandages should then be rolled on, and after the groom has dressed the horses' body these should be removed, the legs well brushed and hand-rubbed, and a fresh set of bandages applied. This is, of course, impossible in a troop stable, but the system can be carried out to a certain extent by the aid of loose straw and the men's rubbers. The friction not only assists the drying process, but also stimulates the circulation. White fetlocks should be washed for the sake of appearance, but care must be taken to dry them—and especially the heels—properly. If bandages can be provided for these cases so much the better. The habit of washing and improperly drying horses legs is a fruitful cause of that eruptive condition of the skin commonly termed "mud fever," with which most of you are doubtless acquainted. I recollect some years ago, when stationed with my regiment in Tipperary, a very considerable number of cases of this affection occurring amongst our officer's chargers and private horses from this cause. In the Army horses are very rarely allowed to return to their stables in a heated condition, but sometimes this is unavoidable as, for instance, the case of an orderly being sent on an important message and told to return as quickly as possible, he probably comes back at a gallop and his horse enters the stable with the heart, arteries, and lungs excited, and in a state of profuse perspiration. In such cases the horse should be immediately taken out of the stable again and walked about with a blanket on for a short time until he has cooled down, otherwise he will probably break out again into secondary perspiration, and congestion of the lungs may result. Another point is that a horse in this heated, excited condition should never be fed or watered till he has cooled down, because the stomach of this animal is a small one and easily gets out of order, and under these conditions it is not in a fit state to perform the functions of digestion. I do not wish it to be understood

that injury is likely to arise from watering horses when in a state of perspiration merely, because this is by no means the case, and I think I am correct in saying that most Commanding Officers when on the line of march very properly take the opportunity of watering their horses frequently at any convenient stream, but it should be avoided while the vital organs are in an excited condition. When tranquility has been restored water and food may safely be given even although the animals coat may be damp from perspiration.

As you are aware, certain regulations as regards clipping, during the winter months have been laid down, and I must confess that the patchy appearance caused by this partial removal of the horses coat is particularly unsightly. I should like to see every troop horse clipped down to within four inches of the knees and hocks, and the long hair of the legs singed fairly close. Of course, it would be necessary to provide good stout blankets, such as are issued in camp and on service in the field, but I am certain the extra expense entailed would be more than compensated for by the improved condition of the animals and the labour saved to the men. I am not an advocate for clipping the legs, except in the case of very coarse-bred draught-horses, for the hair affords a certain amount of protection to the legs, and is an excellent preventive against cracked heels and mud fever. For these reasons the legs of horses that are hunted in rough countries, especially in Ireland, are seldom clipped.

Physical condition is another point worthy of a few remarks. Some officers like to see their troop horses fat and sleek, while others prefer them to be in hard-working condition. Personally, I have an intense dislike to an unduly fat trooper. When a mounted corps is called upon to perform duties of an unusually arduous nature, the fat troop horse is a continual source of trouble. Being soft, he rapidly falls away in condition, his saddle becomes a mis-fit, and, moreover, he is physically unable to endure hardship for any length of time. Of course, we cannot expect the troop horse to attain the perfection of physical vigour as seen in the highly-trained race-horse or hunter, because the quality and quantity of his food and the nature of his surroundings will not admit of it, but with plenty of regular exercise, ordinary care, and good stable management, he may be kept in hard serviceable condition with very little trouble.

In making the above remarks I do not for a moment maintain that if these suggestions are not followed out in their entirety harm will result in all cases, or even in the majority : for most of us have, doubtless, seen horses exposed to many of the conditions referred to without coming to much harm; but I have over and over again known very serious consequences result from the neglect of ordinary precautions, and, as prevention is better than cure, the little extra trouble that is required is well bestowed.

The Chairman—Colonel Walters will kindly continue his lecture on Thursday, but if any officer would like to ask any question on this part of his lecture, I am sure he will be happy to answer it.

DISCUSSION.

Lieut.-Colonel H. Pipon, R.H.A.—There are one or two things which Colonel Walters has mentioned on which I should like to make a few remarks. One is as regards the bedding down at mid-day. I think it is a most excellent plan, and I should like to see it introduced and carried out a great deal more than is done now. I always did it, and I always found that I had plenty of litter.

With regard to watering and having a trustworthy non-commissioned officer to look after the watering of horses, I do not think there can be any more important subject. It has only been in very rare cases that I could really depend upon others seeing the horses watered, and if some arrangement could be made in the stables, such as I had at Aldershot (I am sorry to speak personally so much), of a water trough running through the middle of the large stables there, and also half beer barrels full, it would be found to be an advantage in that respect. In the early morning particularly you cannot get the horses properly watered; it is impossible—it is not in human nature to expect men at that time in the morning, and a cold morning, to stand at the trough and see the horses properly watered. I introduced that system at Aldershot, and what was the consequence? The horses walked about the stables by themselves and drank any amount; there was no kicking each other or anything of the kind. I never saw anything answer better. I think if anybody here went there to see for themselves they would say the same thing with regard to the watering; but until we have some such system I do not think the watering in the stable in winter will be as satisfactory as officers would wish.

Then about the feeding, Colonel Walters said the horses should be fed three times, but would he not suggest that horses should be fed oftener than three times? And I think there is another important thing about feeding, and that is that when horses are fed the stables should be locked up and nobody should be near them. All the horses feed at the same time, and you know how fidgety some horses are when they are being watched, how they keep on pawing and throw the food about and all that sort of thing. I should myself suggest that a stableman is not necessary for the feeding. I would lock the stable up for an hour, and allow no man to go inside while the horse had his corn and hay: I am sure the horse likes to be left alone to feed.

Then, is Colonel Walters an advocate for washing the feet? He mentioned the great care that it required. Are we able to have the necessary supervision of the drying of the feet with a towel? I should have thought that picking out was better, and I should like to have Colonel Walters' opinion about it; and also whether he does not think that if a horse is groomed once well in the middle of the day it is quite sufficient, or does he consider that the wisping in the evening is necessary to ensure the horse looking well.

I was glad to hear what Colonel Walters said about the washing; I was rather afraid he was going to say that he did not care about washing white heels, because he first of all said that he did not approve of washing heels, but afterwards said that he would wash white heels. And I am very glad he has mentioned the subject of clipping. I know it is a thing that is against the "Queen's Regulations," and so one has to be careful what one says about it. I am afraid I have done it against the "Queen's Regulations," and I must say that I did not find a blanket in the least necessary for the care of the horses. I did it for the last three years that I was Major; I had no blanket, and I never had any trouble whatever, beyond, as I have said, that you cannot take horses out in the early morning in the cold and expect to water them out there and keep them well. But the few horses that have, unfortunately, been clipped here have certainly thriven remarkably. I am told by the officers commanding the batteries how they have gained

in weight and how they have thriven. I regret that they were clipped, but still there was the result of it.

And I should like to know whether Colonel Walters would recommend in very hot weather like we had last summer what I have tried at Aldershot, at Dorchester, and here, namely, taking the horses out at nine o'clock at night and watering them?

Major F. A. Yorke, R.H.A.—Colonel Walters has spoken about the hardness of the water. When I was with batteries in India the horses were falling away, and, apparently, there was no reason for it. I spoke to the Veterinary Surgeon, and he tested the water and found it was very hard, so he emptied two cart-loads of dry earth into the water, and the result was admirable—the horses picked up at once. And I have often thought whether here, where the water is so hard, there would be any good result from getting up pure earth and having a certain amount put into the water troughs, stirred through with a clean stick and allowed to settle down again—whether that would have the effect of softening the water, which is no doubt very hard here.

Lieut.-Colonel E. T. Browell, R.A.—I should like to ask Colonel Walters whether there is any special symptom by which one can tell that the horses are not being properly watered; whether there is anything that particularly points to that?

Captain W. J. Honner, R.A.—There are just one or two points I should like to say a word about. I have had much experience of clipping in India in two campaigns, one in Miranzai and the other in the Black Mountains. In the Black Mountains we were 10,000 feet above the sea, and the campaign took place in December and January; in the Miranzai the cold was so excessive that we had several cases of frost-bite among the animals. All the animals were clipped all over, not a single one died, and all put on condition during the whole of the campaign. After commanding a battery for five years I came to the conclusion that an animal should be clipped all over in winter, and twice a year if possible; in summer I clip under the saddles and under the girths, this was for pack chiefly, because it is much more difficult to avoid galls. I have tried not clipping the legs, and I find it is certainly better; at the same time the men are saved much trouble by clipping the legs. We had one or two cracked heels from clipping, but I think the advantages are in favour of saving the men by clipping.

Colonel Walters spoke about the curry-comb. I never could find out the reason why the curry-comb had teeth, and I found it was utterly impossible to prevent the men, especially the natives, from grooming with the curry-comb, so I had to give way to it, and to order that they should use the curry-comb when they liked, but the teeth were removed and the edges all rounded, and it acted as a scraper. I found that by doing that the animal's temper improved very much. It was the teeth in grooming the animals that irritated them, and made them kick; after the teeth were removed and the edges rounded, the corner rounded, I found that they did not mind the curry-comb at all. I just put forward the suggestion that service curry-combs should have no teeth, and should have the edges rounded.

About evening stables, I am glad to hear Colonel Pipon advocate no grooming. I never groom at evening stables. I regret to use the word "I" so often, but I have had a great deal of independent work; we had no Veterinary Surgeon, and had to look after these things ourselves. Our evening stables were entirely devoted to the legs for six years, and we had no grooming at evening stables. I forget what grooming was done in the morning. Colonel Walters says none; but if you go in the stable and look at the horses in the morning you will see how very dirty, as a rule, they are turned out, and if you look at them on parade, and see how nicely the horses must be turned out, that gives you an idea of how much trouble the men have to take in the early morning, so I think before we come to the con-

clusion that there is no grooming we have to give a great deal of credit to the men for turning the horses out as they do; and I think it might turn out that that is one heavy stable, and that a second stable at mid-day ought to be sufficient. In these days, when we want to give as little trouble as we can to everybody, I think it would be a very good thing if that could be done; and if evening stables were entirely done away with except for grooming the legs, I think it would be a great advantage to everybody.

Captain W. Paget, R.H.A.—I should like to ask Colonel Walters what he considers is the best course to pursue with horses that are constantly breaking out again? I understood that he thought it was better not to feed them when they come in as long as the heat is in them. I am talking of horses which, however careful you are to bring them in cool, are very excitable horses, hunters especially, and will break out again in the course of a couple of hours afterwards, as I have known constantly happen.

Veterinary Lieut.-Colonel W. B. Walters—In reply to Colonel Browell, I may say that there is no special symptom by which you can tell that horses have not been properly watered, except a general falling off in condition and a "tucked-up" appearance. If you fancy that any particular horse has been insufficiently watered, have him led again to the trough, and notice the avidity or otherwise with which he drinks.

With regard to what Major Yorke has said about softening the water, that depends upon what the hardness is due to. If it is owing to the presence of sulphate of lime, I do not think that earth will materially soften it; if it is due to the carbonate of lime, it may assist in precipitating the salt. Mixing clay with the water, allowing to settle and stand exposed to the sun and air, is an old and well known custom, and used to be recommended in the treatment of certain diseases.

I am pleased to hear that Colonel Pipon is an advocate for bedding down at mid-day. It is a very important subject, and I should like to see the system carried out more than is now done. I know that many officers do not approve of it, because they think the daily ration of straw insufficient for the purpose, and fear waste. I can only suggest their giving it a fair trial, and am convinced that the result will be satisfactory. It has been so in all cases that have come under my notice, but, of course, care is necessary in the management of the litter.

As regards watering by means of water-troughs running through the stable, that I think is an excellent plan; but at the same time I should like to see water in each stall, that is to say, a small galvanised iron tank alongside every horse's manger. I fear, however, that any suggestions on this point would be objected to for financial and other reasons.

The system of feeding four times a day is an excellent one in a private stable, but it would be difficult to carry out in the Army, because it would entail an extra stable hour. It has been tried and found to fail for this reason. In general condition and appearance our troop horses will bear very favourable comparison with the horses of any other country in the world, and I think that feeding three times a day is really sufficient for all practical purposes.

I entirely agree with Colonel Pipon as to the advisability of watering horses at night during hot weather. It was my custom when in charge of troop horses on board ship, in the tropics, to order them to be watered frequently during the night.

I approve of washing the feet, for this reason: I find that unless the men are very carefully looked after they will not pick out the horse's feet properly; they frequently leave a certain amount of dirt in the frogs, especially of the hind-feet, and if this is allowed to accumulate, and if the clefts of the frogs are at all deep, this foul matter will act as an irritant and may produce suppuration (thrush).

But if the feet are picked out and then washed with the water-brush and dried with the rubber, they can be thoroughly cleansed without unduly softening the horn. That unhealthy condition of the frog known as thrush generally results from carelessness. I say generally, because it may occur as a symptom of deeper seated disease, but unless this is the case it ought never to be present in a well-regulated troop stable.

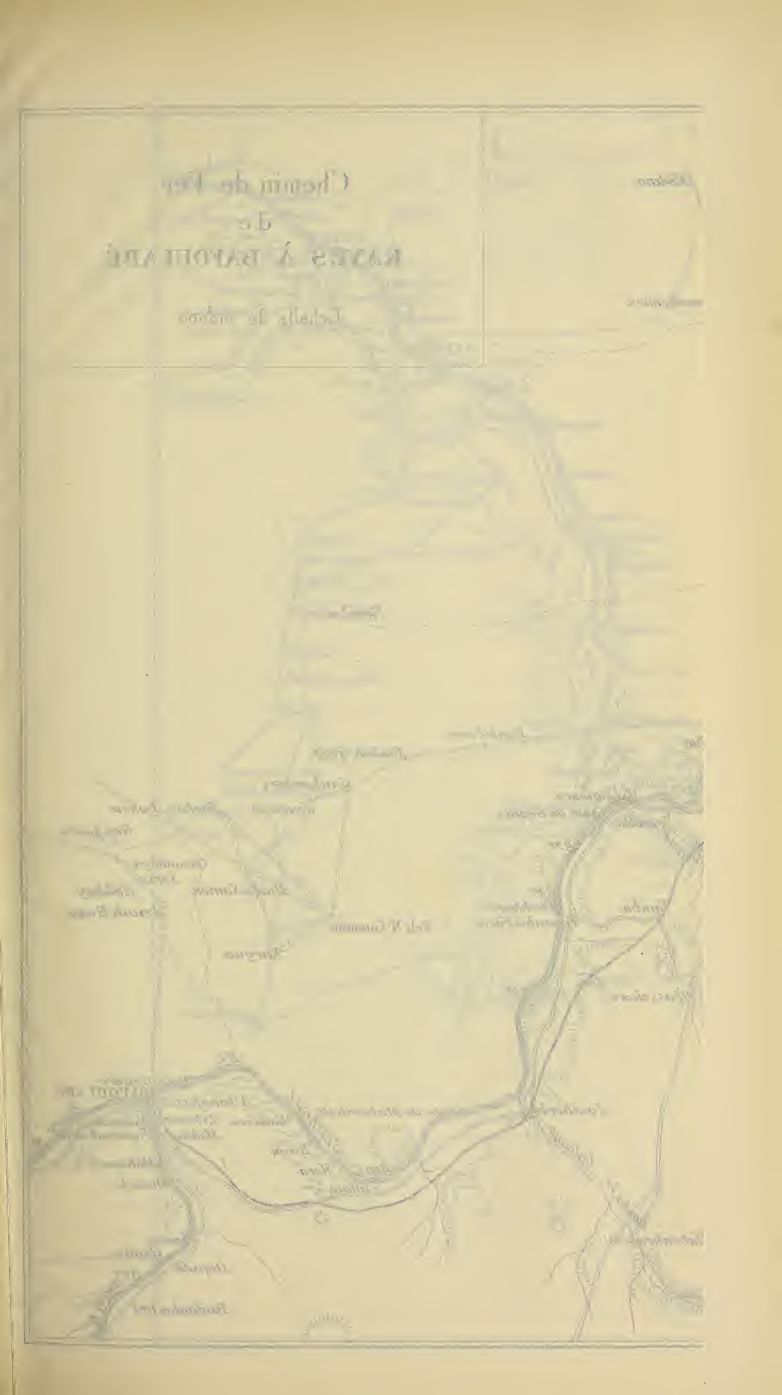
With respect to grooming more than once a day, I think I mentioned in my lecture that the proper time for thorough grooming was the mid-day stable hour. The reason why I referred to the wisping and hand-rubbing of the legs and the use of the rubber during the evening stable hour, was because I consider that nearly the whole of the mid-day stable hour should be devoted to the use of the brush, and if this is done properly there is not much time for the use of the wisp. That is why I advocate the system of damp wisping during the evening stable hour. It removes the superficial dust, stimulates the skin and polishes the coat.

In reply to Captain Honner I wish to observe that I did not say there was no grooming at morning stables, but that the time at the men's disposal was not sufficient to admit of a thorough grooming, especially during the winter months, when the early mornings are dark. Of course the horses are, or should be, turned out clean for parade, but this is accomplished by that which must be considered a more or less superficial grooming.

Captain Honner's remarks with regard to clipping thoroughly supports what I have said on the subject, and I hope Commanding Officers will take this matter up with the view of bringing about a much desired change in the regulations. I have never seen the curry-comb described by Captain Honner, in use, but doubtless the absence of teeth and the rounded edges would prevent irritation to the skin. This arrangement, however, might militate against its legitimate function of cleaning the brush.

Captain Paget desires to know what I consider the best course to pursue in the case of horses that are constantly breaking out again. If they return to stables in a heated condition such animals should be taken out again, and walked about quietly with a blanket on until they are cool. I have found this to be an unfailing remedy.

The Chairman—It only remains for me, gentlemen, to thank Colonel Walters for his most admirable and interesting lecture.



Chemin de Fer
de
KAYES À BAFOULABÉ
Echelle de 1/500.000
KAYES
MEDINE
BAFOULABÉ
Tiguin
Medina
Koulou
Kanamakhounou
Chutes du Félou
Cérou
Guénokhologai
Kaffa
Saboucire
Tintilia
Farabera
Diorrgala
Ekoulou
Singuila
Singuina
Malou
Fangua
Galliera
Batikoto
Sika Kounadi
Sibikilifaro
Kantalo
Dabakourouli
Fakha
Fakha R.
Diamou
Kenieniané
Logosa
Bantibane
Foulah Goré
Kemba
Diguira
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Sambakonko
Kolingheirone
Foulimata
Fatakola
Kogneena R.
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Tebaraka
Mansamah
Guidigoko R.
Bourouko
Tinké
Bordeaux
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Tamba
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Tamba Fara
Koli N'Guemou
Kargua
Ganhanteri
Kondiali
Diokou Diohou
Ganganta
Oussoubiya
Soriu
Diabe Samou
Bakhoy
Amadi Baia
Saeta R.
Oassanharan R.
Sekhokholo
Moussakaré
Faidherbe
Chute de Malembélé
SENEGAL
Allakafisso
Batassou
Liberté
Mahina
Babaroko
Francaiskonta
Bakoy R.
Birou
Kora
Rapide
Talaa
Makinady
Dialola
Tamba to Galouga
Kalemboa
Samea
Oualia
Rapide
Bafing R.
Findouba Res.

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THE FRENCH SOUDAN.

BY

CAPTAIN S. P. OLIVER, *late* R.A.

Sequel.

The account given of the occupation of Timbuctou and the preceding operations of Colonel Bonnier, at the end of the article in the March number of the "Proceedings," was based on the very imperfect news which had reached Paris at the time it was written. The following corrected narrative may, therefore, be substituted for the last portion there given, where it is recorded how M. Albert Grodet had been appointed Civil Governor of the French Soudan.

Before M. Grodet arrived, Colonel Bonnier, as senior commanding officer, had full powers, but it had been expressly notified to him by the Under-Secretary of the Colonies that no new military expeditions were to be undertaken without due permission from the authorities at home.

On the 12th November, 1893, an expeditionary column left Kayes, under Colonel Bonnier for Bammako, where his force was concentrated on the 26th of that month, and crossing the Niger, marched with all haste in order to try and save Ténétou, a large walled village, which Samory's army had been blockading for the last five months, and situated some 93 miles south-east from Bammako; but by the time the French had reached their destination the place had already fallen, and, indeed, it had been sacked by Samory some twenty days previously. Colonel Bonnier, however, pushed on in pursuit of the Almamy, whose track was easy enough to follow, by the dead bodies which were scattered in numbers everywhere behind him; and, on the 5th December, the tirailleurs caught up the rear portion of the Sofa army at Faraba. On the following day they overtook the main body at Kolony, where this African beast of prey nearly terminated his sanguinary career, but he managed, although very narrowly, to escape. As Captain Philippe writes—"*Mais Allah lui a encore ménagé une porte de sortie cette fois.*" His "*griot*," or confidential attendant (the same who had accompanied Samory's son to Paris some time ago), was thrown, by his horse stumbling, and fell into the hands of the French; but Samory himself, mounted as usual on a perfectly sure-footed animal, although but a short distance off, was enabled to elude the closely pursuing Spahis. The tactics of Samory had ever consisted in

retreating before the French, leaving nothing behind him but ruin and desolation, like the track of a hurricane, and never attempting to make a stand. His object was to tire out the Europeans, trusting to fatigue and fever to do the rest, and on this occasion he must have thought that he had succeeded, for after this last engagement the force returned to Ténétou, where a fortified post was constructed and a garrison left, rather to the surprise of the men and officers who were so close on the track of Samory; but the fact was that Colonel Bonnier had other more important and ambitious objects in view. The senior commandant hurried back to Bammako, on the Niger, by the 17th December, and it now became known to the troops that the occupation of Timbuctou had been decided on.

Two divisions were formed; one to proceed by water, down the stream, under the immediate command of Colonel Bonnier; and the second to proceed overland, under Colonel Joffre of the Engineers.

The first division consisted of the 2nd company and 11th company tirailleurs, six De Bange mountain guns of 80 mm (3·15-inch) 18-prs., and all the staff, in lighters, prepared for the occasion. No animals could be taken, and the horses of the staff were sent with the land column. The second division was composed of the 10th and 12th companies,[1] a squadron of Spahis, some irregular horse, two mountain guns, with all the horses, mules, and baggage animals.

The first division left Ségou on the 26th December, expecting, as Colonel Bonnier had been led to suppose, a welcome reception from the townspeople of Timbuctou.

Meantime Lieutenant Boiteux, commanding the small flotilla, the *Mage* and the *Niger*, stationed at Mopti, determined to be the first to enter Timbuctou and obtain the credit of taking possession of the capital of the Sahara for the Navy. Although Colonel Bonnier had given strict orders to Lieutenant Boiteux not to leave his station at Mopti, this officer proceeded to Kabara, where he landed with a few "Laptots" and took formal possession of that place after dispersing with a round or two of shell the few groups of mounted Touaregs who made a slight show of resistance. He next entered Timbuctou and hoisted the French colours in that open town, where the principal merchants had been expecting the arrival of the French.

Unfortunately, his young subaltern, Léon Aube, who was sent with a small party to receive the submission of the various villages in the neighbourhood, was surrounded and cut off by a number of Touaregs in the vicinity of Kabara. The whole detachment of 15 Laptots, one European master's mate, and M. Aube were all slain.

When Colonel Bonnier's force arrived at Mopti, the Commander learnt with surprise and indignation of the unauthorised advance of the gun-boats and of the disaster at Kabara. He lost no time in embarking the 5th company of tirailleurs, stationed at Mopti, in all the available boats, and proceeded with all his staff on to Kabara, taking the 5th and 11th companies with him; but leaving the artillery, 2nd company, and convoy of supplies to follow more slowly in boats very

[1] Only half the 12th company.

heavily laden. Col. Bonnier reached Timbuctou on the 10th January, and wrote the following despatch next day:—

"Timbuctou, 11th January, 1894.

Lieut.-Colonel Bonnier, Commanding Troops in the Soudan Français, to Monsieur, the Governor of Soudan, at Kayes.

Monsieur le Gouverneur,

All the archives being at Kayes, I cannot quote, in this despatch, the dates and exact text of the correspondence of the senior Commandant of the Soudan, relative to the flotilla. But, if you think it necessary, you will be able to discover these dates and text in the registers now in your possession.

An examination of these documents will show that:—

1. Colonel Archinard (Colonel Bonnier's predecessor in office), whilst leaving to the commandant of the flotilla all latitude in regard to convoying merchant lighters to Kabara, prohibited him from carrying on any military operation.

2. I, myself, in confirming the instructions of Colonel Archinard, forbade the commandant of the flotilla, most expressely, to land from his vessel in the neighbourhood of Timbuctou. I had, in an equally express manner, warned him against taking any action on the banks of the Niger, and, latterly, fearing some adventure on his part, I sent a formal order not to quit his naval station.

Lieutenant Boiteux, commanding the flotilla, took no notice whatever of these orders. M. Boiteux proceeded to Kabara, from which place he easily drove out the hostile people. Leaving his gun-boats at Kabara, he further went on to Timbuctou, the submission of which place, as I have before reported, had been already otherwise acquired.

M. Boiteux has thus not only disobeyed the orders of his superior officer, but he has besides committed a military mistake (*absurdité*).

With a thoughtlessness, incomprehensible in an officer holding such a position, he did not weigh the consequences which might result from the course he took.

He did not consider that, with the few men which he had at his disposal, it was easy enough to enter an open town claiming our protection, but that he could not ensure this protection.

He did not consider that it was wrong for him to go on shore, leaving his gun-boats deprived of a portion of their too feeble crews.

Moreover, that occurred which was most likely to happen. A detachment, consisting of Sub-Lieutenant Aube, a second master (European), and 15 'Laptots,' were massacred by the Touaregs. Two native Laptots alone succeeded in escaping.

M. Boiteux cannot escape the responsibility which he thus incurred.

My preceding despatches[1] have acquainted you with my march on Timbuctou, and the necessity which I was under to continue that march after the receipt of your telegram, No. 2, and conformably to the clause contained in the last paragraph of that telegram.

Events have, unfortunately, but too well justified my conduct.

On my arrival at Timbuctou I had an interview, in the presence of Captain Regad, my chief of the staff, with Lieutenant Boiteux, and reproved him for the faults which he had committed—that is to say, disobedience of orders by his superior officer, and military misconduct for his action and consequent disaster at Kabara.

[1] Not yet published.

I informed him, besides, that I should inflict on him thirty days of simple arrest, limiting his punishment in consideration of the unhappy situation in which he was placed.

M. Boiteux replied to me in an insolent and angry tone, employing such expressions as:—'*Nom de Dieu!* . . . ,' and declaring that he had not been beaten, but that he, on the contrary, since the affair of Kabara, had marched against the enemy, which he had put to flight, &c., &c.

I had no wish to continue a conversation so impertinent, and I gave M. Boiteux orders to rejoin his gun-boat.

I inflicted an additional punishment of fifteen days of simple arrest (the maximum allowed me by the decree of 20th December, 1892), on M. Boiteux for having replied insolently and rudely to the reprimands which I administered to him.

The flotilla being directly under the orders of the Governor, I have the honour to submit to you the facts above stated.

I am, &c.,

BONNIER."

The following events are best related in Captain Philippe's full report, published in the *Journal Officiel*:—

"Timbuctou, 21st January, 1894.

Captain Philippe, Commanding Troops, Timbuctou, to Governor of Soudan.

I have the honour to send you a full account of the disastrous affair which has just taken place.

As you know, without doubt, the column embarked on the Niger in boats for Timbuctou was composed of: the Lieut.-Colonel Commanding; all the staff from Kayes; 5th company, taken on at Mopti; 2nd company; 11th company; artillery, 6 guns. The second column, proceeding by land, was formed under the command of Commandant Joffre: Spahis; 10th company; 12th company; the rest of the artillery, and all the horses. This column, which I look for with impatience, has not yet arrived.

On the morning of the 10th January, the column under the Colonel arrived at Timbuctou; the artillery, the 2nd company, and the convoy being still some distance in rear; these groups did not arrive until the 13th. On the 12th, in the morning, the Lieut.-Colonel left, *en reconnaissance*, towards the Touareg camps, at three days' march from here in the direction of Goundam. He took with him his staff, Commandant Hugny, the 5th company, and a detachment of the 11th. The Europeans were mounted on donkeys. He left me the command of the place, as the senior Captain, with the remainder of the 11th company, to await the reinforcement of artillery and 2nd company.

After having taken the camp of the Touareg chief, on the afternoon of the 14th inst., and a number of cattle, learning that the Touaregs were to be found at some distance from there, the column again marched out at 3 p.m., leaving a section of the 11th and a section of the 5th company, under the command of Sub-Lieutenant Sarda, to guard the cattle.

Towards night the column arrived at an encampment, evacuated, or appearing to be so. At 4 a.m., on the 15th, the Touaregs, concentrated at a short distance, surprised the column whilst asleep and not properly watched, in the camp where they had taken up their quarters on arriving, a camp which they considered admirably suitable in the circumstances.

No reconnaissance of the neighbourhood had been made.

Followed by numerous armed men on foot, the Touareg horsemen reached the piled arms before the cry '*Aux armes*' had been raised; the sentinels, placed at but

a short distance from the piles of arms, having been quickly cut down, a party of horsemen at the same time fell upon the staff quartered in an open space, which rendered access to them more easy. The oxen let loose by the Touaregs contributed still more to the horrible disorder of this critical moment.

Captain Nigotte, in charge of the topography, sleeping at head-quarters, was the only one of the staff able to escape, with a sword-cut on his head; fortunately not a very severe wound. He rejoined the detachment guarding the cattle, together with several other fugitives, and has been able to return here with that detachment.

Our reconnaissances, which I have not been able to advance very far, on account of the security of the place, immediately surrounded by horsemen, hovering in small groups and flying before the least demonstration, have been able to recover and bring in several more tirailleurs; others have returned singly, but mostly without arms or ammunition. All the staff[1] has fallen, and the regiment lost Commandant Hugny, Captain Tassard, and Lieutenant Bouverot. Europeans—Sergeant Etesse, 5th company; Sergeant Gabriel, 11th company. Natives—Sergeant Samla Diakaté, 5th company, and 61 tirailleurs; of whom, 41 of the 5th company and 20 of the 11th; 2 corporals of the 5th and 4 of the 11th; 95 rifles and 10,000 cartridges.

I await with impatience the column of Colonel Joffre, which ought to be not far from the theatre of the tragedy, at three days' march from here. I have taken all precautions possible, and everyone is on the look-out; the sanitary state is good, in spite of many cases of diarrhœa; my Sergeant-Major has been seriously ill for the last three weeks, and is incapable of moving in spite of his good-will. I fear I shall have to send him back. I have given, provisionally, the command of what remains of the 5th company to Lieutenant Franz of my company. . ."

The Occupation of Timbuctou.

The former Government had, it appears, been warned of the projects which the staff of the military Commandant of the French Soudan contemplated carrying out against Timbuctou, and the details of which campaign had already been fully arranged. As the Government had declared in the Chamber that the period of important military expeditions had terminated, now that the reports of the senior officer in the Soudan had indicated the progress of general pacification, after the last campaigns undertaken against Ahmadou and Samory had come to an end; the then Under-Secretary of State for the Colonies, M. Delcassé, substituted a Civil Governor for the supreme charge of the colony in place of the military Commandant.

M. Albert Grodet was appointed during the latter part of November last, and he duly arrived out at the chief seat of the colony, at Kayes, about Christmas. His first act was to inform himself of the general situation, and to obtain from the various Commanding Officers a knowledge of the disposition of the troops. He learned, not without some difficulty, that Colonel Joffre of the Engineers, instead of continuing his survey for the railway between the upper Sénégal River and the Niger, had proceeded to Ségou, where he was to take charge of a column. He likewise learned that Lieut.-Colonel Bonnier, after having inflicted a defeat on the bands of Sofas, under Samory, in the neighbourhood of Ténétou (a town situated on the Baoulé, an affluent on the

[1] Lieut.-Colonel Bonnier, Commanding; Captain Livrelli, Marine Artillery; Captain Sensarric and Lieutenant Garnier, Marine Infantry; and Doctor Grall, Colonial Service.

right bank of the Niger), had next turned his column and proceeded to Ségou-Sikoro, more than 300 kilomètres to the north-east.

But when the Governor requested the officers in charge of districts to inform him precisely of the actual localities where he could find the officers commanding these two columns above-mentioned, the only reply he could obtain was, that Colonel Bonnier and Commandant Joffre had departed for "an unknown destination." The same answer met his enquiry as to the whereabouts of the commandant of the flotilla, which should have been found at the anchorage of Mopti, the principal port of Macina, conquered last year by Colonel Archinard.

The Governor thereupon telegraphed to the commander-in-chief of the troops, as well as to the several commandants of districts and circles, that on taking over charge of the government of the Soudan, he therewith recalled to mind, in conformity with his instructions, that no military expedition whatever could be proceeded with unless sanctioned by the formal authorisation of the Government. Lieut.-Col. Bonnier acknowledged the receipt of this telegram without saying where he was or what his plans were.

In face of this studied disobedience of his instructions, and in order to enforce respect for his authority, so defiantly set at nought by the superior officers of the Army of Occupation in the Soudan, M. Grodet proposed to the new Under-Secretary of State for the Colonies, M. Lebon, the supersession of Lieut.-Colonel Bonnier from the chief command of the troops in the Soudan. The answer (which was read in the Chamber on Saturday, 10th February), came :—"We approve the measures taken. Government insists that no expedition shall be undertaken without its authority, unless of necessity to repress aggression. You can count upon my support to make your authority as Governor respected."

Meantime, M. Grodet continued to telegraph to the heads of districts for news of the columns. In reply to a categorical demand, one of them at last admitted that the military forces of the colony were, in fact, engaged in an expedition against Timbuctou.

The Governor, in consequence, had just issued an order to stop the advance of the columns when he learned of the arrival of the flotilla at Kabara and the massacre there of Sub-Lieutenant Aube and his Laptots; and, next, was informed officially of the departure of Lieut.-Colonel Bonnier for Timbuctou and, finally, of its occupation.

It was impossible under these conditions to prevent a campaign which must involve the open hostility of the Touareg tribes and the incidents which, as already related, occurred in due course. The Governor could not recall facts already accomplished; the French troops being at Timbuctou, they must evidently remain there; at all events until the Home Government had been fully informed and given their decision on the subject. It was thus that M. Grodet, in relieving Lieut.-Colonel Bonnier from his command, named Commandant Hugny to replace him, the same officer who was second in command of the column, with orders to stay at Timbuctou, and there to hold himself altogether on the defensive.

The Government thought that it was to the interest of the country

to leave a strong garrison at Timbuctou, and to take all necessary measures to ensure the safety of that post. The raid and *razzias* which led the column under Bonnier to Dougoi could hardly be said to form part of the programme to act strictly on the defensive. So the contention that M. Grodet could be held responsible for the late disaster was altogether untenable.

On receipt of the news of the disaster at Dougoi in Paris, some excitement necessarily was manifested, but the patriotic declaration made by the then President of Council and Minister for Foreign Affairs, M. Casimir-Perier (now better known as the newly-elected President of the Republic) in the Chamber of Deputies, on the 10th February, was characteristic of the traditional policy of the French nation. M. Casimir-Perier announced that reinforcements from Algeria would immediately be despatched to the front with the least possible delay. He added—"The Chamber will think, evidently, like the Government, that there can be no question of evacuating Timbuctou. It is impossible: France does not draw back before a check, however severe it may be. That is impossible, I repeat; viewing it even from the standpoint of our security, that would be the most imprudent of measures."

After this statement was made by M. Casimir-Perier in the Chamber, an attempt was made by interested parties to shift the responsibility for the unfortunate disaster of Dougoi from the military commander to the Civil Governor. It was asserted that the despatches communicated to Parliament and to the public had been mutilated, and that, for example, in the despatch of Captain Philippe, the words *"en reconnaissance"* had been interpolated, in order to throw the personal responsibility of the movement entirely upon the late Colonel Bonnier. According to the version which it was sought to give credence to, the commander of the column which had occupied Timbuctou had left that town in obedience to the formal orders which had been brought to him by Major Hugny; and it was on this return march towards Kayes, carried out in conformity with the instructions from the Civil Governor, that Lieut.-Colonel Bonnier, Major Hugny, and their comrades had lost their lives.

This theory, apart from the fact that it in no way exonerates the leader from the responsibility of want of precaution and being caught asleep by the Touaregs in their surprise attack, cannot be made to agree with the fact that Colonel Bonnier had left, several miles in rear of his main-body, under command of Sub-Lieutenant Sarda, a detachment guarding the captured cattle. Had the column under Bonnier been in retreat on Kayes, it would surely not have been followed by a rear-guard, encumbered, moreover, by herds of captured cattle, the possession of which would utterly retard the march of troops operating in an enemy's country, where it was highly desirable to be on the alert against sudden attacks, in which the Touaregs excel, as all the world knows, or ought to know.

Why not admit, on the face of it, the facts self-evident from the text of Captain Philippe's telegraphic despatch, that the light flying column led by Colonel Bonnier, accompanied by all his staff, was on the march against a Touareg encampment, in order to avenge the death

of Sub-Lieutenant Aube, of the *Mage*, and also to inflict a severe punishment by carrying off by way of fine the Touareg cattle. Such reprisals have frequently been taken in South Algeria and in the Soudan, and are the usual methods employed in dealing with nomad populations.

Although the official despatches containing the full details of the march of Colonel Joffre to Timbuctou have not yet been made public, a *résumé* of his operations was sent to Paris by Governor Grodet at Kayes, by telegraph, on the 26th February, 1894, which will serve to elucidate the course of his march, although the names of the places mentioned are not marked on the official map :—

"Governor, to Colonial Department, Paris.

Kayes, 26th February, 1894.

"The second column, under the orders of Commandant Joffre, was composed of one company and a half of tirailleurs, a squadron of Spahis, 30 auxiliary Spahis, two guns (Mountain, 80 mm). It included besides all the horses and mules of the first column. It followed the track by land, passing by Sansanding, Moninpé, Nampala, Lére, Soumpé and Goundam. Its operations were as follows :—

The 27th December, passage of the Niger (*i.e.* from Ségou to north bank). The march was often delayed by the difficulty of renewing the large amount of corn and forage, necessary for 250 horses and 1000 natives, in a ruined and hostile country, and also by the inundations of the Niger, which were exceptionally high this year between Lére and Timbuctou.

The column halted at Nampala from the 7th to 10th January for the purpose of obtaining supplies of corn; it arrived at Soumpé on the 16th, having turned aside, through the bush, to avoid the country inundated by the Niger, without finding any inhabited places.

Nioukou, the chief of the Niafounké canton, had insulted and threatened our envoys. On the 20th January we marched on Niafounké with one company of tirailleurs, the cavalry and artillery. But we found ourselves impeded by a 'marigot,' two kilomètres in breadth and three feet deep, which surrounded the village. 400 warriors were in line in front of the village. At our first opening fire they charged us, some of them reaching within three yards of our line, in a quarter of an hour 100 were killed by our fire, the others took to flight, and the village was taken. No loss on our side.

At Micore and Atta, we found the villages evacuated by the inhabitants, who had carried off all the canoes. Captain Pouydébat, after a night's march, arrived on the 26th January, at daybreak, before Goundam, on the left [right?] bank of the stream, but he was unable to take the boats by surprise, the Touareg, warned beforehand, being at Goundam, on the other bank of the river, which is 300 yards in breadth and has a rapid current.

Captain Prost, with a squadron of Spahis and half a company of tirailleurs, then in rear, proceeded towards Tinghirma on the Niger, where he arrived, after a march by night of ten hours, and collected a quantity of corn and four boats. The villagers, who resisted, lost about 30 men. We had one tirailleur wounded.

The boats, manned by our men, arrived on the 31st, in the evening, at Goundam; the sight of them produced much commotion among the Touareg, who assembled near the point where we must disembark; they were dispersed by a few rounds of shell, and fled during the night. The last had disappeared by the morning of the 1st February, when we commenced crossing the stream.

On the 2nd February, the flotilla (of gunboats), warned by one of our scouts who had been able to reach it, arrived at Goundam. It assisted the passage of

the river, which was accomplished by the 3rd. We learnt from it of the surprise of the 15th January. The Touareg had fled towards the north. A reconnaissance despatched in that direction found no trace of them: they marched more than four days over a very broken country.

On the 7th February the column resumed its march on Timbuctou and, on the 9th, reached the place of the fight of the 15th January.

The bodies of the missing officers and non-commissioned officers were found and carried to Timbuctou, where we arrived on the 12th February.

Throughout (the march of) 434 miles, we have lost two native tirailleurs, died from sickness, and one native tirailleur, wounded.

The sanitary state has been satisfactory throughout.

The populations, tired of the robbery and violence of the Touareg, are on our side.

The chief of the Soumpé district accompanied us to Timbuctou.

The principal chiefs of the sedentary tribes and the heads of villages in the neighbourhood soon came and gave in their submission, acknowledging the French Protectorate. . . . . ."

Later despatches read as follows :—

"On the 3rd of March, Captain Gautheran, with 40 tirailleurs and a machine-gun (Hotchkiss), marched against the Touareg camps at Takai-Gourou, dispersed the Touareg horsemen there, killing several, and captured 80 of their sheep and 50 asses. In another direction, on the 5th March, Captain Prost, at the head of 225 Soudanais auxiliaries, 80 Spahis, and two mountain guns (80 mm), surprised a large band of Touaregs near a *marigot*, killed a number of them, and seized a herd of 1000 sheep, without a casualty to his own men.

The effect of these raids was soon indicated, by the envoys of the Touareg Tengueregnif coming in to request an amnesty, which was granted, on condition that five of their notables would reside permanently at Timbuctoo, and that the movements of these camps of the nomads were constantly reported; whilst a fine of 1000 sheep was required to be delivered within 20 days.

These conditions not being complied with, Colonel Joffre marched against the encampment of the Touareg Tengueregnif, between Lake Goro, near Diré and Lake Fati. On learning the approach of the French the Touareg prepared to resist them in a position taken up near Lake Goro, where they were speedily dislodged on the 23rd March with great loss, their chief and his principal lieutenants being slain. On the 25th they were again attacked in their camp and driven into the country between Lake Fati and Goundam. Colonel Joffre's column captured on this occasion 50 horses, 30 camels, 8000 sheep, 400 oxen and 200 asses; whilst the bodies of 120 Touaregs were found on the field of action. Only one of the Tengueregnif chiefs escaped, having been badly wounded at Goundam, he remains at Farash with a few partisans. All the other chiefs were killed and, in fact, the tribe has practically been extinguished. The news of this exploit has caused a sensation throughout the Sahara, and must inevitably spread the prestige of the French flag, which might have been endangered had the disaster of the 13th of January been allowed to go by unavenged."

The latest news from Timbuctou is very satisfactory to the French authorities, the position of the garrison has been strengthened by the establishment of two new posts at El Waledji, north of Safay, and another near Salaféré, at the junction of the Barra Issa and the Koly-Koly. The chief, or portion of the Kountos, near Bourroum, on the right bank of the Niger, has also submitted.

The Thiouk, a peaceable fraction of the Irreganaten, have sent emissaries asking for peace; and the Hel Antassar remain tranquil.

Other chiefs were coming in, and the sedentary populations of Timbuctou and the neighbourhood were resuming their normal life.

It must be remembered that the basin of the Niger was formally one of the most populous countries in the world. It is only within the last 65 years that the invasions of Mahomedan fanatics, and conquering Bambarras and Toucouleurs have devasted this once fruitful and happy country.

Meantime Samory pursues yet his sanguinary career in the region drained by the Upper Cavally, which basin has just been recognised by Liberia as within the French sphere of operations. Captain Marchand has, quite recently (July 26th), arrived from this country, where he has been exploring the Bandama River, after finding Samory in possession of the Upper Cavally. There is more work yet to be done, more hard fighting to be gone through before Samory can be disposed of; and it is a thousand pities that the late Colonel Bonnier did not follow up his redoubtable adversary after defeating him near Ténétou, instead of leaving the pursuit to precipitate the advance on Timbuctou.

THE SANITARY CARE OF THE SOLDIER BY HIS OFFICER.

A REPLY.

BY

BRIGADE-SURGEON LIEUT-COLONEL E. NICHOLSON.

I HAVE been asked by Royal Artillery officers what I thought of the lecture delivered by Brigade-Surgeon Lieut.-Colonel Evatt at Woolwich, and published in the May number of the R.A.I. "Proceedings," and, having served many years in the Regiment under the old system, I have decided, after careful reading of the lecture, to put my opinion, and the reasons for it, in writing, and to forward the whole to the Institution under the auspices of which the lecture is published.

I must own that on first reading the lecture I began to be carried away by sentiment; one cannot entirely resist the journalistic influences around us, the wind of humanitarianism which is blowing over the West (followed, unfortunately, by the gales of socialism and anarchy). But, as I read on, the bitter cry of the sanitarian began to sound so many false notes that sense soon got the better of sensibility, and I began to read critically as well as sympathetically. By the time I got to the end of the lecture, I found it difficult to sift the valuable matter from the much larger quantity of what I cannot approve either in substance or in tone. The great improvements in barrack life have not been brought about by exaggerated statements, and further improvement is more likely to be checked than encouraged, if these are allowed to stand without a protest.

I have always taken a lively interest in the soldier's welfare, and have found that generally all the conditions for a fair, often great, amount of comfort (relatively to the standard of it in the class whence the best soldiers are drawn) could be secured by good management; while the amount of disease or disability caused by defects in the conditions of barrack life, whether in England or in India, was very small compared to that produced by other defective conditions. For example:—

Taking a hospital in a large R.A. station, I have frequently found that the proportion of drivers to gunners in hospital is larger than their relative strength, and on measuring these drivers I have found that the majority of them were under the standard of chest measurement; low standard drivers, not being up to their work, drift into hospital (or prison). I venture to say that laxity in the recruiting of drivers has produced far more disease among them than all the sanitary defects of barracks have caused in the whole of the batteries to which they belong.

No doubt the good management on which I rely depends mainly on the Regimental Officers, especially on the Commanding Officer; if he is watchful against all fraud at the expense of the soldier, resolute that all rations and allowances shall be made the most of, zealous for justice in short, the management will be good and the soldier will be comfortable. In this good work the Commanding Officer will be greatly helped by a sensible Medical Officer, but I doubt if any amount of hygienic lecturing will have the effect of producing that good management. And much harm may be done if a lecture, such as Lieut.-Col. Evatt has delivered, be found unsound in the facts adduced to support the arguments. For instance, there will be found at pages 220–223 a lengthy and impassioned statement of his objections to the soldier's ration, from which I extract, principally from page 222, the following statements which are capable of verification (or otherwise), and will thus serve as a test of the general accuracy of Lieut.-Col. Evatt's facts.

"We are trying to keep the soldier on a ration that he cannot do his work on. We give him his 1 lb. of bread and his ¾ lb. of meat, and stop him 3½d. or 4½d. a day for the grocery ration, but it does not keep the man going, and the way to prove it is that in those corps that are better paid, like the Army Medical Service, the Royal Engineers, and the Army Service Corps, the men lay out much on food. . . . . A man drinks because he wants food. . . . A man wants at least his 1 lb. of meat a day. I have asked dozens and dozens of soldiers if the ¾ lb. meat ration is sufficient, and I find they are all laying out extra money; those other well-paid corps are all laying out more money to keep themselves strong and fit. . . . Look at those young recruits who are going out to India to fight typhoid; they want to be well fed most awfully. . . . I say the measure of his drunkenness is the measure of his want of food. And also another thing is his tobacco; the soldier is perpetually smoking. I think his drinking and smoking are his attempts to satisfy his demand for food. . . . The moment a sergeant is broken and put back to the ranks, he is pulled down at once by the want of food."

I will now simply state facts within my own knowledge which will, I believe, show how far the above statements are accurate and thus give a fair measure of the probable accuracy of the other statements in the lecture.

Experience in many corps has shown that the fixed part of the ration, the meat and bread, supplemented by the variable part, bought at the canteen by a stoppage of 3½d. to 4½d., can only be insufficient through bad management, which should not last long without inquiry from the General commanding the district. When the Army Orders on the subject are carried out, and the attention of the Commanding Officer is duly given to the cooking, experience shows that the ration can supply four fair meals daily. I know that in the three units at the station from which I write this is the case. In the R.A. Sub-Depôt the recruits pay 4½d. for grocery, because they have meat or fish for breakfast, as well as puddings and pies for a second course at dinner; though I believe that equally good meals might be given at a lower rate. Soup is also provided for supper. There is a well-supplied supper-room at the canteen, but it is very little used, owing to the plentiful meals

provided. In the squadron of Lancers, the messing stoppage is under 3½d., and the meals are excellent. In the detachment of the Medical Staff Corps under my command, the messing stoppage is rather under 3½d. than over it, and arrangements are made by which the detachment, and also the hospital inmates on convalescent diet, have not only a sufficient dinner, but also a good soup meal at 8 p.m. This is not a station where any extraordinary attention is paid to the subject. I know things might be better managed, here as elsewhere, but account must be taken of the caprices of the men, of the inherent low faculty of cookery in the English race; here as elsewhere, the devil sends cooks, and if angels came to take their places they, too, would soon degenerate, in barracks as on board ship, to the level of the tastes of those they cater for. But yet, what are the results? It happens that I keep a record of the weight of every recruit on his joining the Sub-Depôt and on his being drafted off to Portsmouth. Here are the recorded weights of the 120 recruits who have left from January to April, after a stay here of about six weeks, more or less:—

7 = 6 per cent. have fallen off (1, 2, 3, 4, 4, 6, 7 lb.)
6 = 5 ,, have neither lost nor gained.
107 = 89 ,, have gained from 1 to 22 lb. in weight.

Of these 107 who have gained, 41 have gained 7 lb. and upwards, while six of them have gained 14 to 22 lb. In the seven who had fallen off, the loss could always be accounted for, illness, intemperance, age much above the 24 years and 10 months that figured in the attestation, or a bloated barman fined down by a healthier life.

It may be objected that the recruits buy extra food. I will, therefore, take the case of the boys, who, getting no pay to speak of, cannot buy extra food. There are upwards of 20 of them, between 15 and 17 years of age. I found, soon after taking charge of this station, nearly three years ago, that these boys were nearly all under the R.A. standard of their ages. I had them put at gymnastics, as well as trumpeting and schooling, and I measured them every three months at least; the consequence was that they improved rapidly, the newcomers, too often much under standard, soon attained it, and this improvement in physique was accompanied by such a development of high spirit as to require special attention to the maintenance of good order. The improvement being due, not to more food, but to exercises that develop the appetite for food, it is evident that their rations are amply sufficient. And conversely this is proved by the fact that when they are weighed at the end of January, on their return from their Christmas holidays at home, they are, almost without exception, found to have fallen off. But the loss is soon made up, and I warrant that every one of these boys will have full weight and chest measurement when he is 18. A lad went off last week, on being posted to a company; he had gained in the last twelvemonths 3¾ inches height, 3 inches chest, 33 lb. weight. I measured another this morning, on transfer. He has gained in the last 16 months, since his arrival here as a very undersized boy, 3½ inches height, 3 inches chest, 17 lb. weight. Both lads are a little over 15. The average annual gain of all the boys is 16 lb. weight and 2½ inches chest measurement.

I think I have now given proof that the ration is sufficient with ordinary good management. It is not so complete as the Indian ration, but we must remember that Miss Nightingale (whom Lieut.-Col. Evatt quotes as an authority on these subjects) has denounced the Indian ration because of the excessive amount of meat which, in her opinion, it contains. The home system of a fixed and a variable part of the ration, the latter purchased at the canteen by company arrangements, has the advantage of adaptability to circumstances. Scotsmen can have porridge, Irishmen can have extra potatoes, old soldiers can have curry, and the lads jam-rolls. Besides, whatever special food happens to be cheap locally can be bought at great advantage.

It is scarcely necessary to disprove the assertion that the soldier's "drinking and smoking are attempts to satisfy his demands for food." If it were so, how is it that "this great fighting machine, the German soldier [who] fights because into his body you put plenty of food," is so fond of tobacco—and of beer? And do we not, unfortunately, see only too many cases of excessive smoking and drinking among Englishmen and Americans who want for nothing in the way of food? Lieut.-Col. Evatt says "a man drinks because he wants food." This is an example of the unfortunate statements which abound in the lecture, and deprive it of all authority. We know that the inability to resist the temptation of drink is confined to no class, and is most prevalent, irrespective of wages, where education, in the true sense of the word—bringing-up —has been most defective. But if the home ration is insufficient, neither will the complete Indian ration satisfy Lieut.-Col. Evatt. He says "you cannot conceive how bad the Indian rations are." I passed many years in India, and my observations were entirely opposed to this view; the ration is complete, and a trustworthy soldier is appointed at every station for the sole duty of seeing that the cattle for his comrades' rations are healthy and well-fed. It is true that his term of office is not usually of very long continuance, so fat does he get on it, and a change in the interest of his health is desirable. But, at all events, it cannot be denied that the meat, like the rest of the rations, is well looked after, and the cooking is well-known to be excellent.

Lieut.-Col. Evatt refers to the rations of foreign armies. Closer inquiry would show that everywhere the ration is fairly in accordance with the working-class dietary of the country, that everywhere there are complaints, and nowhere are the materials of the ration better than in our Army, though the management of the food may be better on the Continent, where the people have more taste for cooking than in this country. Taking as an example the Italian Army (one scarcely likely to be as well fed as ours), I see it asserted by a Medical Officer of that Army, in an essay published in Paris, "*Sur l'alimentation du soldat*," that the ration is amply sufficient, that the men keep in excellent condition on it during manœuvres, but that sickness appears when the troops return to villages and towns, where the hospitality of the inhabitants supplements the ration liberally.

The real difficulty is that the English soldier is a bad cook, and no training can give him that sense of cookery which is almost an instinct

with a Frenchman or an Indian. He is, therefore, unable to make the best of his rations; he believes in nothing but flesh and potatoes; he will waste half his potatoes in the peeling; he will throw away his bread; he likes to have all his meals as early as possible, and to clear away the last meal as soon as possible, so as to be able to go out of barracks. The soup meal in the evening is a difficulty; the cook is apt to resent the innovation and purposely to make the soup so bad that the men will not take it; then it will be reported that the men do not care for it, and the cook-house can be closed as formerly before 5 o'clock.

All this is to a certain extent a matter of good or bad management, for the soldier should not be left to complain; he should feel that the Commanding Officer's eye is never closed, and his scent for abuses keen. There is no doubt some blame attaching in many cases to officers, in that they are not zealous in scenting out petty fraud or other practices to the prejudice of the soldier. At the same time officers may reply that abuses are difficult to uproot, and soldiers put up with abuses which are sometimes indirectly advantageous to them, as exemplified in the Indian canteen system, by which too often those in charge make large illicit profits and the men are enabled to obtain liquor at the backdoor. I must refer back to one statement before concluding my vindication of the home ration. Lieut.-Col. Evatt says, "The moment a sergeant is broken and put back to the ranks, he is pulled down at once by the want of food." Is it not much more probable that being generally broken for intemperance (which cannot be said, in his case, to have been caused by want of food) he further drowns his shame in liquor, and his debilitated stomach turns against food? Tippling habits are far too common among sergeants, and in India especially, where the canteen system is too often their ruin morally and physically, a sergeant laid up by an accident is generally a bad patient to deal with.

I have as yet only touched on one single part of Lieut.-Col. Evatt's lecture; before leaving it I would draw attention to expressions in which accuracy appears to me sacrificed to sensation. "Look at those young recruits going out to India to fight typhoid; they want to be well fed most awfully." Now, we know that the recruits are not going out to India to fight typhoid, even figuratively; well fed or ill fed they could not do it. But the Medical Officers can fight typhoid, for, like cholera, it is a disease generally due to sanitary defects within the jurisdiction of their Department.

Unfortunately, statements of this kind abound in the lecture. Thus (p. 208) :—"This poisonous atmosphere, which, mind, will poison an open wound if exposed to its pernicious influence, will cause a strong healthy man to sink into ill-health and give him consumption, and did in the old day kill off the splendid ante-Crimean guards-men at the rate of 20 per 1000 per annum." But as we are also told (p. 211) that the death-rate of the Guards was "20 per 1000 per annum, that bad standard of old years, until in 1890 it has fallen to 9·88 per 1000," it is evident that the poisonous atmosphere did not kill off 20 per 1000—since that was the total death-rate *from all causes*, as it is now 9·88 from all causes. And there is no mention of the fact

that since that time the change from 21 years' service to seven and three year terms of service is largely to be credited with the reduction of mortality. One line, a page farther on, mentions the possibility of short service having something to do with the diminution of the death-rate and invaliding-rate, but it is only to hint that it masks disease by putting men into the reserve who would in old times have been invalided. Men returning from India, on the expiration of short service, appear to have said to Lieut.-Col. Evatt, "It is too much bother to re-engage; I am constantly getting ague and feeling seedy, and I am going to the reserve." Soldiers say other remarkable things in reply to Lieut.-Col. Evatt's questions. "Dozens and dozens of men" assure him that the ¾ lb. of meat ration is insufficient and that they are all laying out extra money for food. They tell him they would as soon sleep on a coir mat as on a barrack-sheet, that they all slept in sheets and in night-shirts at home; soldiers' wives assure him that they wash their sheets once a week. Certainly the short service system does not appear to have extinguished the "old soldier."

I refrain from going into the other points of barrack-life treated in the lecture; and for this reason, that I hardly find a single instance in which the alleged defects can be laid to the neglect of the regimental officers in their care of the soldier. I can see defects for which the R.E. are responsible, others which the medical authorities might well attempt to remove, others where a want of intelligent co-operation between those two departments, as in faulty plans of new buildings, is the evident defect. I can also see that Lieut.-Col. Evatt's system of training the junior "sanitary specialists" under him, though admirable in plan, seems practically to have been ineffective in many of the matters where one would have expected it to show well. Thus:—"When I go to the hospital ward and turn down the clothes of the men's beds their nails at times frighten me, they stand out like tiger's claws, they seem never to cut them." For my own part I have found an immediate cure for any sign of this state of things in a hint that at the next weekly inspection I shall order shoes and socks off. An occasional barefeet inspection is a perfect preventive of defects of this kind, and I may add I have never had any difficulty in getting a full parade of men for medical inspection if I wanted it seriously.

To resume, I fail to find throughout Lieut.-Col. Evatt's lecture a single defect justifying its title—a single one in which the fault lies with the Regimental as distinguished from the Medical Officer. I think I have said enough to show how much could be done by the Regimental Officer in removing the abuses which prevent the best being made of the soldiers' rations and other allowances, and which tend to make him discontented. No class of men are more grateful than soldiers for any efforts to protect them against abuses about which their instincts of discipline make them keep silence. It is no part of my present task to enter into any details on this subject of good management; but every officer with a high sense of duty must have it at heart, for there is no more noble career than that of making rough unpromising material into good self-respecting soldiers, helping them to make the best of the necessarily rough surroundings of military life, remembering that vice will tempt those men least whose life in barracks is the most cheerful.

MEMOIRS
HISTORICAL AND BIOGRAPHICAL.

THE BROME-WALTON FAMILY.

BY

MAJOR AND QUARTERMASTER R. H. MURDOCH, R.A.

(Assistant-Superintendent of Records).

(Continued from p. 256, No. 5, Vol. XXI.)

Chapter VI.—*Conclusion.*

In the eternal cycles of rise, progress, culmination, decline, and replacement (by a higher organisation and enlarged environment), which have characterised all things mundane since the world began, *Field* artillery attained its climax in the *Seven Years War*, and acquired no further development of any importance—with the exception of the Congreve "rocket," and "Shrapnel" or spherical case shot—until the substitution of rifled for smooth-bore ordnance in 1859: so that the artillery historian will have to chronicle *Minden* field guns and carriages at *Waterloo*, and Waterloo guns and carriages in the *Crimea*.

The long peace that ensued upon the close of the *Seven Years War* presents an almost unbroken record of gradual starvation and decay of Field Brigades until the organisation in 1793 of "Royal Horse Artillery" and the futile resuscitation, in 1806, of the "car brigade" of Gustavus Vasa; while, in painful contrast to the combination of mobility, elegance, and power at *Minden*, we have the following spectacle depicted in his Diary of 1800 by General A. C. Mercer:—

> "At Woolwich, two brigades prepared for grand camp at Swinley Common, each drawn by six horses, with drivers mounted as postillions. . . . . The other was a brigade of 6-prs., under Lieut. Wallace, going as battalion guns to the Guards, drawn by three horses each, harnessed as a cart team and driven by contract carters in smock frocks."

We would fain pause to describe the expiring brilliancy of the achievements of field and position artillery at Belleisle, the Havannah, and in the War of American Independence—under the most severe hardships and disadvantages—were not these episodes sacred to the *Memoirs* of the *Tovey*, *Desaguliers*, and *Cleaveland* families (should such ever be written). The most prominent individual in this last period was undoubtedly the celebrated *George Washington*, "grandson of *John* Washington, a gentleman of the south of England, emigrant to America in the XVII. Century."[1]—who, if the Livys of the American Commonwealth could permit their Romulus to have had an inferior origin, would no doubt prove to be identical with the gunner John Washington, who

[1] Chamber's *Encyclopædia*, 1847 ed., art. *Washington*.

joined the artillery trayne in the south-east of England, at Greenwich, *anno* 1680, served with the Expeditions of Queen Anne to Virginia and Canada, and returned in 1718, to America, to command the artillery in Annapolis Royal, with the rank of Lieut. Fireworker,[1] under Royal Warrant of 1st February—dying in 1731, a few months before the birth of George Washington, in Captain Hughes's Company (now No. 5 Southern Division, R.A., at Rawal Pindi). General Washington's *penchant* for the artillery Arm can thus be accounted for.

While *Field* artillery decayed in the era of "peace and retrenchment," under the mischievous idea that it could be re-improvised in one day, the lessons of the *Seven Years War* taught the absolute necessity of reviving and developing *Siege* and *Position* artillery; and the period from the close of that war to the end of the XVIII. century is marked by intense activity in this department of the evolution of ordnance and *matériel*. "Tubes of brass and iron" had obtained, in the land of nitre, in the days of Tubal Cain (whom the XX. century philologist may prove to have been "Tubal Cannon"); and both metals were simultaneously employed for both *field* and *siege* ordnance from the dawn of artillery history to the XVIII. century; but, on account of the increasing cost of brass, *iron* gradually became the service pattern at the latter end of that century[2]—recoil being minimised by weight of metal. Borgard was the restorer of brass ordnance at the close of XVII. century, and all his mortars, howitzers, field and siege guns, were solely of this metal; but the extraordinary progress of the iron trade of our country in the latter half of XVIII. century, owing to the discovery of the Roman method of smelting iron ores, not only enabled it to add considerably to the number of our heavy ordnance by the re-substitution of iron for brass, but to greatly increase the calibres and effect.[3] To enter into details would be to write the history of the iron trade between 1750 to 1800, and of the successive experimental committees of field officers R.A., of whom Colonel *Joseph Brome* was throughout an active member, with his son, *Thomas Walton*, as the scientist and staticist of the Board of Ordnance (in conjunction with Dr. Hutton). Gunpowder, also, had become so much improved in quality that the 18-pr. (iron) of the Peninsular campaigns was of equal range and power with the 24-pr. (brass, *i.e.*, bronze) of the XVIII. century, just as Borgard's 18 and 24-prs. (brass) had equalled the 24 and 42-prs. of XVII. century.[4]

In these developments of XVIII. century *Siege* artillery and carriages, the *Brome-Waltons* enacted minor parts in comparison with others whose names are household words in the Royal Artillery.

The time has, therefore, now arrived for concluding, in the order in which introduced on second page of Chapter I., the *Memoirs* of the distinguished gunners who constituted the artillery members of the *Brome-Walton* family.

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[1] *Artillery List* (Kane), p. 1. *See* also Appendix B.

[2] Ordnance Warrant Books.

[3] Scrivener, "Hist. Iron Trade." Muskett, "Papers on *Iron and Steel*." Board of Ordnance Record Books.

[4] "*Gunnery*" (Greener). "*Our Engines of War*" (White-Jervis).

CHARLES BROME.

In Chapter IV. we left this XVII. and XVIII. century gunner returning, on 1st September, 1755, to Halifax, after his siege and capture of *Beau-Séjour* (Fort Cumberland), to resume in peace and honour, without promotion or reward, the functions of artillery Commandant in Nova Scotia, undisturbed until the invasion of the "Royal Province" in the summer of 1757.

This invasion was by the conjoint naval and military expeditionary forces destined against *Louisbourg*, but shut up in Nova Scotia, for the season, by the superiority of the French fleet. The arrival of the Expedition was fraught both with pleasure and pain to Captain Brome. Proud must this grand old warrior have been to see his grandson—Lieut. *Joseph Walton*, R.A. (Chapter IV.), sound in mind and body, arrive in command of H.M. Bomb-ship, the "*Furnace*"—a command regarded at this time as the most dangerous, yet most coveted. On the other hand, the land forces included a Lieut.-Colonel R.A. (Williamson), with some companies of artillery; Captain Brome was consequently displaced from his Commandantship and relegated to the minor charge of a detached fort. The Board of Ordnance, however, with that kindly consideration towards its sons which this autocratic parent occasionally manifested, gave Captain Brome the option of returning to Woolwich—of which he availed himself in December, 1757, having buried 20 men of his brigade of 100 during his command;[1] and at Woolwich we find him actively employed as President of Courts Martial, Inspector of Drills, Captain of the Day, &c., until the autumn of 1759 heralded the glories of *Minden* and the death of *his* son, his *only* son, Lieut. *Robert Brome* (Chapter V.).

The crushing blow appears to have bent the head and broken the spirit of the brave old soldier, who, however, manfully stood to his guns until 20th November, when his turn came for promotion to a vacant regimental Majority *abroad*. Alone, as a widower, bereaved of his son, and his only daughter married, Captain *Charles Brome* declined the promotion (which fell to Captain John Godwin), and obtained 12 months sick leave pending retirement[2]—most probably ending his days in the Gun House at St. James's Park, the official residence at the time of his step-son Lieut.-Colonel *Joseph Brome*, the Master Gunner of England and A. de C. to the Commander-in-Chief of the Army in Germany, as he cannot be traced in the Ordnance Quarter Books after 1762.

The Royal Warrant, of 13th July, 1761, authorising Captain Brome's retirement, on Full Pay, "after 63 years of continuous service," will be found in *Appendix A*. Who knows anything of the subject of the origin and evolution of *Retired Pay and Pensions*, to officers, soldiers,

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[1] "To Capt. C. Brome, R.A., for burying 20 of his men in Nova Scotia, £17"—*vide* "Orders to Paymasters," December, 1757. These men had mostly been tomahawked by the Indians (the Merrimacs).

[2] Up to February, 1761, Capt. Brome signed the monthly *Rolls* of his new company, dated at Gibraltar; but the *Pay Lists* explain that Antonio Forman remitted his pay to him in England.

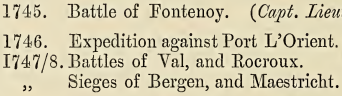
and families? The subject has never been attempted in any regimental history; and the theme would involve a special chapter, starting from the period of Henry VIII. and the dissolution of the monasteries. The whole subject would constitute a Treatise on "Military Sociology," fraught with the most delicate topics; but the particular "Fund for Superannuation"—referred to in the Warrant—formed the origin of Retired *Full* Pay to Army Officers, under the following circumstances:—

In December, 1714, the officers disbanded after the *Spanish Succession War* complained direct to Parliament that while they were sent adrift on *Half* Pay after their services in the war, other officers who had never quitted England continued to serve (on Full Pay). Parliament resolved not to receive Petitions from officers except through His Majesty; but voted a subsidy, to be renewed annually, to the Crown, out of which to provide *Full* Pay retirement to such officers as had distinguished themselves in the wars.[1]

The full significance of the selection of Captain *Charles Brome* for this distinction will now be manifest. His war services had been:—

		Siege and Capture.	
Chapter I. (*under Borgard.*)	1702.	Fort St. Catherine, Cadiz.	
	,,	,, Malaga.	
	,,	,, Duran, Vigo.	
	1705.	Town and Castle of Valencia d'Alcantra.	
	1706.	Ciudad Rodrigo.	
	,,	Alcantra.	
	1708.	Minorca.	
	1715.	Suppression of Scottish Rebellion.[2]	
Chapter II.	1745.	Battle of Fontenoy. (*Capt. Lieut.*)	
Chapter III.	1746.	Expedition against Port L'Orient.	"Captain Extraordinary," *i.e.*, *Staff Captain.*
	1747/8.	Battles of Val, and Rocroux.	
	,,	Sieges of Bergen, and Maestricht.	
Chapter IV.	1755.	Siege and Capture of Beau-Séjour; *Died about 1762.*	*Commandant R.A.*

We cannot see Captain Brome's face in any Portrait, and can only touch his "Dead Hand" in the signatures to R.A. Pay Lists; but the regimental epitaph of Borgard's first pupil in 1698 is written in the last message bequeathed



to the Royal Artillery by General Borgard, the father of the *regiment*, in the veteran General's despatch of 12th April, 1750, to the Governor of Nova Scotia:—

"Captain Chas. Brome, R.A., has embarked for the New World;
And I recommend him as A Very Good Officer."

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[1] Ordnance Warrants Book, 20/1/1715, p. 30.

[2] This item was undetermined in Chapter I., but has since been decided by discovery of Lord Dartmouth's letter of 13th April, 1713, to the Board of Ordnance. (*Warrants Book*, p. 38).

Lt. General Joseph Brome.

MASTER GUNNER OF ENGLAND.

THORN, WOOLWICH

JOSEPH BROME (1st.)

At the conclusion of the *Seven Years War* the popularity of the Marquis of Granby, Commander-in-Chief and Lieutenant-General of the Ordnance (with whom Lieutenant-Colonel Brome continued as *A.-D.-C.*), was unbounded. Fox despatched special couriers to seduce him into political life, and to offer him the choice of the "Ordnance" or of the "Horse Guards;"[1] and on 1st July, 1763, the Marquis became Master-General of the Ordnance and Commander-in-Chief, being succeeded as Lieutenant-General of the Ordnance by Lord George Townshend. Lord Granby died on 18th October, 1770—his last official act having been to give R.A. officers the Sword in lieu of the Fuzee, and to authorise the German mode of wearing the Sash, round the waist instead of over the right shoulder.[2] As the whole patronage of the Ordnance was vested absolutely in the Master-General, and there was no Adjutant-General of Artillery prior to 1795,[3] nor other intermediary save the Commandant at Woolwich (Major-General G. Williamson), it will be obvious how vast must have been the trust reposed in Col. Brome, as Artillery Staff Officer to the Master-General, whom even the poisoned arrows of *Junius*, levelled against Lord Granby, failed to wound.

The period from the peace of 1763 until 1770 was singularly uneventful in the history of the Royal Artillery. One battalion, of 10 companies, was quartered in America (then being inundated by the swarms of disbanded troops, with their families, from Europe); another battalion was divided between Gibraltar and Minorca; while the third remained at home. Reliefs were conducted by whole battalions (until the Committee of 1819, presided over by the Duke of Wellington, determined the company as the unit for reliefs). In addition to these were the artillery Trains in India and with the Expeditions against the Havannah and other Spanish possessions in the West Indies: also, a separate company of cadets.[4]

It was thus solely due to the Marquis of Granby and to Colonel Brome that the reductions in the Royal Artillery on the conclusion of the *Seven Years War* were carried out on a different system from that which had hitherto prevailed: *field* brigades were dismounted, trains disbanded, and each company reduced from 107 to 57 men; but the cadres of the three battalions, with their companies, were preserved intact—ready for expansion on any sudden emergency.[5] The junior Lieutenant-Fireworker of each company was retired to half-pay, but owing to the preservation of cadres the last Fireworker was re-employed in 1767.

Lord George Townshend—a political *attaché*, without military experience, and lately Lord-Lieutenant of Ireland—would appear to have been an extremely unpopular successor, in October 1770, to the Marquis

[1] "Memoirs of the Reign of George III." Vol. I., pp. 145, 370.

[2] "Cleaveland MSS.," item 20th April, 1770.

[3] G.O. 27/3/1795. "His Majesty has been pleased to appoint Major Macleod as Deputy-Adjutant-General of Artillery." G.O. 29/10/1795. "His Majesty has been pleased to appoint Major Macleod, D.-A.-G. R.A., to be Lieut.-Colonel in the Army."

[4] "Kane's (Artillery) List," p. 205.

[5] "History of the Royal Artillery" (Duncan), Vol. I., p. 241.

of Granby. Lieut.-General (afterwards Field-Marshal) Henry Seymour Conway, the courtier and warrior, at first refused to serve under him as Lieut.-General of the Ordnance,[1] and then applied for and obtained Colonel *Brome* as his *A.-D.-C.* Of Lord George's administration of the *personnel* of the Ordnance, as Master-General, we have but few and uninteresting records: and beyond the "Townshend" cannon in the Museum of Artillery at Woolwich, which bears the significant inscription:—

Fidelity, Fidelity,
Hath won these honors.

he is best remembered as the Master-General who abolished commissions from the ranks to lieutenancy in the Royal Artillery, yet was he known to the end as Patron to Brigadier-General Samuel Cleaveland. In 1771 he created the 4th battalion; abolished the grade of *Lieutenant-Fireworker*, which had existed since Henry VIII.; and in 1774, conjointly with General Conway, took over the cost of the R.A. *Band* (which had been maintained by the officers of the battalion at Woolwich);[2] while in politics he was one of the most prominent and persistent advocates of the civil war with the Americans.

General Conway was not suffered to retain Colonel *Brome* on his staff beyond a few months, as, in December 1770, Brome's promotion to the regimental Majority at Woolwich separated him from his patron and friend. They had fought together at Dettingen, Fontenoy, Ghent, Ostend, Val, and in the last year of the Seven Years War, when Conway was second in command to the Marquis of Granby; were both of the "Martinet" or "Cumberland" school; and their friendship remained constant up to the death of the Field-Marshal in 1795, in London. On parting with Colonel Brome, General Conway obtained for him a distinguished service reward of £182 10s. per annum (Royal Warrant 13/11/71) in recognition of his service on the staff throughout the *Seven Years War:* this, with the 52 guineas per annum which Colonel Brome enjoyed as *Master-Gunner of England*, granted for the campaign of 1758, amounted to a total distinguished service reward of £237. Good old times!

Lieutenant Blomefield (afterwards Sir Thomas Blomefield, *Bart.*, for the siege of Copenhagen) had the fortune to succeed Colonel Brome on the staff; and original letters (about to be deposited in R.A. Institution) afford insight into the lax orthography of proper names and into the secrecy attending these appointments. Dating from St. James's Park, on 21st December, 1770, to Lieutenant "Bromfield," Colonel Brome writes:— . . . *the staff is fixed* (*i.e.*, new 4th battalion) . . . *there is something better for you, I cannot mention it here; call on me here, when I shall be able to tell you* . . . . Colonel Thos. Ord (of Genl. Braddock's disastrous expedition) writes, from Shooters' Hill, on same day:— . . . Dear "Bloomfield" . . . . *The Fates have decreed something better for you. I suppose you will soon hear from Colonel "Brome"* . . . . ; and directs his letter to Capt. "Bloomefield": while General Conway, dating from *Park Place,*

[1] "Dictionary of National Biography," art. Conway, p. 53.

[2] "Cleaveland MSS.," *anno.* 1771, also 1774.

25th December, 1770, writes to Lieutenant "Blomfield" . . . . *I am not sure if Colonel "Broome" has acquainted you with the intentions I had with regard to yourself, which were, now on his promotion to the Majority, which of course takes him from me, to desire your attendance with me in his place* . . .[1]

The period of Colonel Brome's command at Woolwich abounded in items of local interest, a few of which only can be now particularised.

On 6th July, 1773, the occasion of George III. visiting Woolwich in State had well-nigh cost the life of Col. Brome, for whom, in 20 years of continuous war service, no bullet had ever found a billet, by an incident which is thus described in the "History of the Royal Artillery," Vol. I., p. 266, from the contemporary MSS. of Col. Cleaveland:

[Note.—At this time the Commandant of Woolwich was General G. Williamson (the conqueror of Louisbourg), with Colonel Brome as Commanding R.A.]

"Colonel Brome, in parading in front of the Regiment, before His Majesty, on a very beautiful and well-broke horse, but very tender mouthed, checked him, which made the horse rise upon his hind legs and fall backwards upon his rider, who is so greatly bruised that his life is despaired of."

Yet such was the vigour of this hardy veteran that shortly afterwards we find Colonel Brome serving on a committee of field officers, and for 23 more years we shall find him actively in harness.

In 1777 Brome was promoted Colonel in the Army; in 1782, Major-General; and in 1793, Lieutenant-General.

In 1778, the Repository was built and laid out.

In 1776, the eastern half of the barracks at Woolwich was completed and occupied by eight companies from the Warren.[2] The site had been chosen in 1772 by General Conway, Major-General Williamson, and Colonel Brome—a site which, apart from defensive considerations, would be considered very picturesque were it anywhere but at Woolwich. In 1781 the western half was completed; in 1783 the Mess-room (now the Garrison Theatre) was finished, and continued in use until 1782, when the present Mess-room was allotted and the former building converted into the Garrison Chapel. The quarters supported by colonades were termed "Officers' Pavillions;" the others, "Men's Barracks." In 1791, General Brome, who had supervised the commencement and completion of the barracks, made the following representation to the Board of Ordnance :—

"Woolwich, 16th December, 1791.

My Lord, and Right Honorable and
Honorable Gentlemen,

I have to submit to your consideration the present state of the Barrack Field, which, from its various irregularities, is extremely unfavourable to the appearance of the Regiment on a Field-day or Review. I would wish to propose that it might be plowed up at a proper season, in order to obtain a general level surface, the ridges now being so numerous that it is impossible to preserve the appearance of being well dressed, although the Battalion really is so. The ground on which the reviewing General is supposed to take up his station is particularly subject to the

[1] General Brome's residence at Shooters' Hill (now occupied by Admiral Crofton) is to this day incorrectly spelt "*Broom* Hall;" but General Goodenough (present occupant) has taken care of the correct orthography of the adjacent "*Blomefield* House."

[2] "Records of Woolwich" (Vincent), Vol. II., p. 386.

inconveniences which I have remarked, and could be remedied in the manner I have now suggested.[1]—I have, &c.

(Sd.) Jos. Brome,
Maj.-Genl., Commandant."

His Grace The Duke of Richmond,
Master-General,
and the Rt. Hon. and Hon. the
Principal Officers of H.M. Ordnance.

This was approved by the Board, and carried out at once.

The year 1779 was a trying time for the Commandant at Woolwich (Genl. Belford, of Culloden fame), and his second in command (Colonel Brome, who had been Belford's adjutant at Culloden), in quelling the riots of the sailors, in February, and the rising of the convicts in the Warren—when the anarchists of the period threatened to burn the Warren, release the convicts, and destroy the national ordnance. General Belford died from the prostration caused by his exertions, on horseback, to defend the Arsenal and the convict establishment.[2]

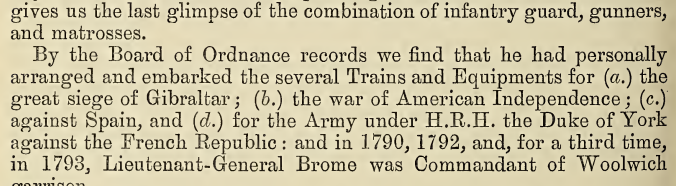
In 1782, Major-General Brome was in harness, as President of a General Court-Martial, and of successive committees on (*a.*) ordnance and carriages; (*b.*) relative precedence for command, &c. of regimental Captains *versus* brevet Majors; (*c.*) baggage fund scales to officers for active service.

In 1783, when temporarily commanding the garrison at Woolwich, General Brome's hand signed the order for abolishing the grade of *Matross*, whose origin, functions, and history have been detailed in Chapter I. (footnote). The accompanying representation of a field-day, *circa* 1770, taken from a painting on metal in R.A. Institution, gives us the last glimpse of the combination of infantry guard, gunners, and matrosses.

By the Board of Ordnance records we find that he had personally arranged and embarked the several Trains and Equipments for (*a.*) the great siege of Gibraltar; (*b.*) the war of American Independence; (*c.*) against Spain, and (*d.*) for the Army under H.R.H. the Duke of York against the French Republic: and in 1790, 1792, and, for a third time, in 1793, Lieutenant-General Brome was Commandant of Woolwich garrison.

* * * * *

On the 24th April, 1796, this extraordinary man and distinguished gunner yielded up his spirit, at Shooters' Hill—aged 84 years—thus finishing a career unexampled in the history of the army. General Brome lies buried within the entrance of the church of St. Nicholas, known as "Old Plumstead Church."



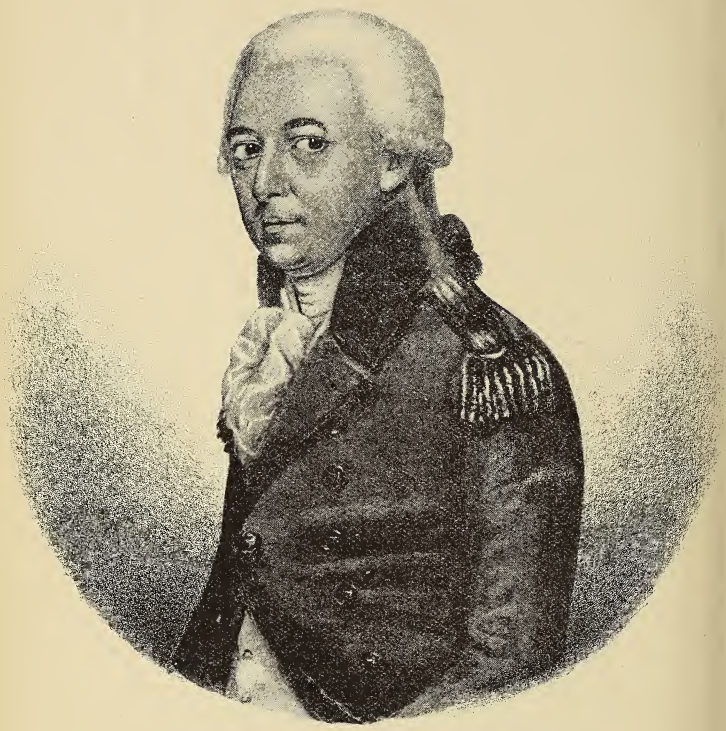
[1] By a singular irony of fate, in 1893, when a great-grandson of General Brome's visited Woolwich for the first time, in proceeding from the Record office to the Commandant's house, the Barrack Field happened to be closed against the public—on account of the drought; and the sentry unwittingly warned him off the grass!

[2] "Records of Woolwich" (Vincent), Vol. II., p. 387. "England's Artillerymen," p. 16.

Thorn, Lith. Woolwich.

Thorn, Lith. Woolwich

MATROSSES, GUNNERS, GUARD. CIR. 1770.



Lt. General Joseph Walton.

MASTER GUNNER OF ENGLAND.

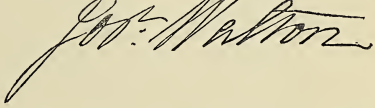
THORN, WOOLWICH.

* * * * *

From the author of "England's Artillerymen" (p. 19) we learn that General Brome was of short stature, very attentive to duty, but very reserved, especially towards the younger officers who had emerged from the Academy (probably from a sense of his own entry into the service, of which he was justly and ostentatiously proud): the same author also quotes the anecdote (from Benson, Brome's contemporary), that on one occasion, while Commandant, General Brome, in returning the salute by the guard of "present arms," went up in great displeasure to the drummer who had beat two ruffles carelessly, upbraiding him with his inefficiency, dismounted, and passing the suspending belt over his own neck began to rattle ruffles, exclaiming—"There, you young dog, that's the way I used to beat the drum when I was a drummer."

JOSEPH WALTON.

The portraits of Lieutenant-General *Joseph Brome*, and of his distinguished son, Lieutenant-General *Joseph Walton*, have been procured, by kind permission of Lieutenant-General Milman, C.B., Major of the Tower of London, who holds the original paintings. For the history of Joseph Walton, *see* Chapter IV.



THOMAS WALTON.

The second son of *Joseph Brome* entered the Ordnance Department in 1762 as "Clerk of Stores" with the Expedition to Portugal in 1762 under Forbes Macbean—a position which is now designated by the more imposing title of "Assistant-Commissary-General of Ordnance;" and subsequently in the war of American Independence, under Brig.-General Cleaveland, R.A., as senior Ordnance Officer.

On return to England he retired on half-pay, and devoted himself entirely to the experimental sciences and to mathematics applied to gunnery, in which he had already established a name by his scientific treatises, and contributions to the *Philosophical Magazine*; and he was given a paid sinecure in the Warren as "Keeper of the Scientific Instruments"—a post which he retained, under the Inspector of Artillery, until his death in 1830, in which year Major-General Sir Alexander Dickson was Inspector of Artillery. The volume of Walton's "*Gunnery Tables*," and details of his services in Portugal and as Scientific Instrument Keeper are preserved with the "*Dickson MSS.*"

JOSEPH BROME (2ND).

The last artillery *Brome* emerged from the Royal Military Academy, as Second Lieutenant, on 14th August, 1794—the date of creation of the 5th battalion R.A., to which he was posted at Woolwich—and combined in his services the varied experiences of his distinguished ancestors. With him expired the family torch which, in the hands of *Charles Brome, Joseph Brome* (1st), and *Joseph Walton,* had lighted us through the dark jungle of artillery history in XVII. and XVIII. centuries, when every gunner was a hero with but a handful of such corn in the earth.

To write a Memoir of the war services, by sea and land, of *Joseph Brome* (2nd) would involve a review of artillery history from the *Expedition to the Helder* in 1797, under H.R.H. the Duke of York, to the crowning episode of *Waterloo,* under the Immortal Duke, including the naval actions, under Admiral Nelson, in which Brome fought in command of Bomb-ships, until 1802; and would require a "just proportion" to be devoted to the abundant crop of his brilliant contemporary gunners of the *Macleod, Cuppage, Congreve, Shrapnel, Robe, Adye, Dickson, Gardiner, May, Lloyd, Wood,* and *Whinyates* families. Lurid is the light thrown over this period by the historians of the Royal Artillery: yet is there need for all the side lights of personal *Memoirs* of these illustrious families, in their respective orbits, which can alone help us to disperse the shadows of general regimental history.

The author of the present *Memoirs* had originally intended—from such meagre and imperfect sources as muster-rolls, ordnance records, monthly returns, &c. (in R.A. record office), and gazettes and despatches (in the national record office)—to devote two or three chapters to the last of the artillery *Bromes,* in order to review artillery operations under the above-named triumvirate, to whom were committed the destinies of our nation, from the breaking out of the great French Revolution up to the withdrawal from France of the Armies of Occupation; but it has since come to his knowledge that (owing to an act of munificent generosity) the Committee of the R.A. Institution has become possessed of vast collections of original *MSS.,* official and semi-official, collected and preserved by an eminent Peninsular and Waterloo officer, which will throw a flood of light authoratively upon the whole period covered by the life of the last of the artillery *Bromes,* whose individual importance was relatively that of the proverbial "fly upon the wheel."

It must therefore suffice to close these *Memoirs* by briefly summarising the services of

JOSEPH BROME (2ND).

14th August, 1794	Commissioned 2nd Lieut. R.A. in 5th battalion at Woolwich.
22nd Sept., ,,	Promoted 1st Lieut.; and ordered to Erith, as second in command of Royal Artillery detachments for East Indies.
8th June, 1797	Returned to England; and appointed to command of H.M. Bomb-Tender, *Judith,* in the Downs.

14th May to 25th June, 1798	Expedition to Holland, to destroy the Bruges Canal, &c. Actions on the coast of France.[1]
18th Nov., 1798	Expedition against Minorca.[2]
August, 1799	Expedition to the Helder, Walcheren.
18th April, 1801	Promoted Capt.-Lieutenant of the *Thunder* Bomb-ship.
August, „	Expedition to Boulogne, and destruction of the French invasion flotilla.
	Defence of Toulon; and covering the evacuation. Particularly distinguished himself. Mentioned in despatches of Admiral *Viscount* Nelson:—"Captain Brome did all that was possible to annoy the enemy."[3]
January, 1802	Expedition to West Indies. Command of the Bombs off Port Royal, Jamaica.
July, „	Returned to England. Rejoined at Woolwich for land service in R.A., and posted to 3rd battalion as acting Adjutant. Appointed Adjutant of 3rd battalion, *vice* A. Tulloh, from 1st Jan., until promotion of 13th Aug.
„ 1804	Rank of "Captain-Lieutenant" converted into "Second Captain" (Captain in the Army) by Royal Warrant of 19th July.
„	Promoted Captain R.A. In command of No. 3 company 3rd battalion (6-pr. field brigade) at Canterbury (now No. 5 Company, Western Division, R.A.) Exeter in December.
November, 1805	Returned to Woolwich.
December, 1805 to February, 1806	Expedition for defence of Hanover, under Sir A. Wellesley. In command of a light field brigade (6-pr.), as above.
1807	Expedition to Copenhagen, under Sir A. Wellesley (Major-Genl. Thos. Blomefield in command of R.A.). Commanded 6-pr. light brigade. Investment and siege of Copenhagen ("History of the Royal Artillery," Vol. II., p. 162).

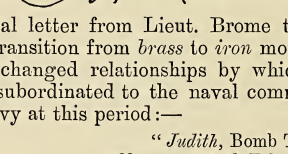
[1] Capt. P. Fyers, R.A., of the *Sulphur* Bomb, who commanded all the Bombs, wrote on 25th June, 1798, to Colonel W. Congreve:—"We were six times in action off the towns of *La Hogue, Havre de Grace, Dives*, and against a corvette." *Also, on 25th May, 1798*:—"In our Ostend Expedition we anchored in the Roads unobserved . . . . We were ordered to injure the shipping as much as possible, and we were obliged to use the mortars at 45°. From the *Hecla* 212 shells and 10-inch carcasses were fired, and from the *Tartarus*, 292 and 100 10-inch shells, with nearly 10 lbs. of powder each time. The former is much shook; but the latter is not injured—probably owing to her not having opened the embrasures. Prince William desires me to remember him to you . . . ."

[2] The Artillery Train (land service) from Gibraltar was commanded by Colonel Wm. Cuppage, who took with him, as Adjutant, Lieut. (afterwards Sir Alexander) Dickson. Lieut. Dickson wrote in his journal, at this time, "If the Navy be increased we expect the old *Thunder* Bomb to come out."

[3] The reputation of the *Thunder* Bomb must have been very general, as about 30 years later (when it might reasonably have been forgotten) a new lease of its fame was established by the popular comic song of "Billy Taylor," in which the heroine was promoted—

"First Lieutenant
"Of the *gallant Thunder Bomb*."

	1809	Expedition to Walcheren, in command of light brigade. Engaged in both first and second operations of the Scheldt Expedition, including actions of Walcheren and South Beveland, under command of Brigadier-General John Macleod, R.A. ("General Macleod's Journal").
4th June,	1813	Brevet of Major in the Army.
	1815	Waterloo. In command of 9-pr. brigade[1] at Hal, defending Brussels. *Medal.* Siege of Cambray, and operations of the Allied Army *en route* to Paris.
	1816	Returned to Woolwich.
	1819	Gibraltar.
8th August,	1821	Promoted Regimental Major, R.A., and Commandant of R.A. in West Indies.
24th July,	1823	Promoted Regimental Lieutenant-Colonel.
4th January,	1825	*Died at Jamaica.*



The following semi-official letter from Lieut. Brome throws some interesting light upon the transition from *brass* to *iron* mortars for the Bomb-ships in 1799, the changed relationships by which the R.A. Bomb officer had become subordinated to the naval commander, and the idiosyncrasies of the Navy at this period:—

"*Judith*, Bomb Tender,
Sheerness, 11th February, 1799.

From Lieut. Joseph Brome, R.A.,
to Colonel Congreve, R.A.

Dear Sir,

I beg leave to inform you that the *Hecla* and the *Tartarus* Bombs have received orders to deliver up their *brass* mortars, and the *iron* ones are to be sent from Woolwich immediately—a circumstance which does not altogether please the captains of the above vessels, for they run away with an idea that the *faster the fire the greater the execution* must be, and we have given them to understand that *iron* mortars cannot be fired in that manner.[2] To tell you the truth, sir, I am glad we are to receive iron ones, should they answer the intention of firing at the low angle (21°). Were we to keep the *brass* ones I think it more than probable they would be rendered unfit for service the next bombardment—for Captain Oughton, knowing that no accident can happen more than the running of them, would be, as he was at *Ostend*, plaguing me every moment to fire, telling me it was the Commodore's orders to fire as fast as possible: but if we receive *iron* ones I shall be easy on that head, as they are alarmed at the very idea of them. I

[1] Now 5 Western—designation not having been altered by the change of armament to 9-pr.

[2] Captain R. Fead, R.A., likewise writing on 10th May, 1798, to Colonel Congreve from the Margate Roads:—" . . . Captain Hand of the *Tartarus* has received instructions that the committee of field officers had approved of $\frac{1}{12}$ weight of shot as the charge for y^{e} 32-pr. carronades (iron); but, in all the experiments I have seen lately with the 68-pr., 4 lbs. have been quite sufficient. *As sailors are always fond of using as much gunpowder as possible*, I fear accidents may happen if $\frac{1}{12}$ of the shot weight be adopted."

should be obliged to you, sir, to favour me with a line whether the iron mortars we are to receive are as long as the brass ones we have on board: if they are not, I shall thank you for your ideas on this subject, whether there would not be some danger arising from the firing of them at the low angle. The iron, 16″ mortars, on Captain Shanks's Bombs are about 9″ shorter than the brass ones that we have, which strikes me as a great consideration, in firing at the low angle, by bringing the fire so much more into the body of the ship . . . . ."

* * * * *

CONCLUSION.

Of the extensive and brilliant war services of Genl. *Charles Mercator Brome-Walton* ("Fontenoy" Walton, as he was called, from the circumstance of his having been born on the battle-field of Fontenoy—for which *see* Chapter III.), and of General *William Lovelace Walton*—son and grandson of Lieut.-General *Joseph Brome*—we are not permitted to discourse in this Memoir of Royal Artillery history, as these worthies served in the Guards: suffice it to say that in all respects they emulated the deeds of their illustrious Artillery progenitors, and added lustre to the achievements of the *Brome-Walton* family.

The writer has long pondered how he could in one sentence express the predominant characteristics of this distinguished but hitherto comparatively unknown family, whom he has been pleasurably constrained to disentomb out of the long buried past and to "make free from among the dead;" and in defining these as the union of *brilliant abilities and performances of the individual members* with uniform *conscientious performance of duty* he is but applying to one Royal Artillery family the characteristics which all history attests have ever distinguished the Regiment at large, so inimitably pourtrayed in the well-weighed and deliberate expressions of His Excellency, General Sir H. A. Smyth, K.C.M.G., in bidding farewell to the Royal Artillery in Malta:—

"His Excellency, the Governor, assured his hearers that he left, with great regret, the Regiment he was proud of belonging to, not so much because of the brilliant abilities and performances of some of its members, or so much because of its old institutions, or its general good repute (though none of these attributes should be underestimated), but because of the high sense of, and devotion to, duty, which, during nearly 50 years' service, he had always found to be a characteristic of its members as a whole. It is by this conscientious performance of duty that the honour of the Regiment in the field has been upheld, and the difficulties which the progress of inventions, and the constant and rapid changes of armament, must continually present to artillerymen, have in the past, and will in the future, be successfully overcome by the Royal Artillery."[1]

* * * * *

The writer must not close these pages without placing on record his sense of the deep obligations he is under to the splendid Royal Artillery Library at Woolwich, to the vast stores of material available in the R.A. Institution, and to the assistance so generously accorded by the officers in charge—particularly to Major A. J. Abdy, R.A., the Institution Secretary: and last, not least, to his private friend, John Watts, Esq., of Kent House, Deal, for the care and judgment with which he revised the proofs of the several chapters of these Historical Memoirs.

[1] "Proceedings," R.A. Institution, February 1894, p. 4 of Notes.

APPENDIX A.

GEORGE R.

Whereas *Charles Brome*, Esq^re^, a Captain in Our Royal Regiment of Artillery, hath served well sixty three years in Our said Regiment, but being now infirm and unable to undergo the Duty and Fatigue attending the Service, is therefore desirous to retire from the same; and whereas it would be for the good of Our Service that he should retire accordingly. And We thinking it just and reasonable that some Provision should be made for his Support and Maintenance, Our Will and Pleasure therefore is, and We do hereby require and direct that out of such Monies as shall be from time to time in the hands of the Treasurer of Our Ordnance for the allowances to Superannuated and disabled Officers and Men who have served well in the Trains of Artillery in Flanders, Germany, North America, Africa, the East and West Indies, with the Half Pay of Officers reduced, you do cause the sum of Ten Shillings per diem to be applied and paid to the said *Captain Charles Brome*, or his Assigns, the same to commence the Twenty fifth day of November last, and to continue during Our Pleasure; and that you insert the said Sum of Ten Shillings per Diem, from time to time accordingly in your Estimates to be presented to Parliament; and for so doing this shall be, as well to you as to the Auditors of Our Imprests, and all other Our Officers and Ministers herein concerned, a sufficient Warrant.

Given at Our Court at St. James's the 13^th^ Day of July 1761, in the First Year of Our Reign.

By His Majesty's Command,
S^d^ W. Pitt.

To Our Right Trusty and
Well Beloved Cousin and Councillor,
John, Viscount Ligonier,
Master General of Our Ordnance.

APPENDIX B.

JOHN DUKE OF MARLBOROUGH &c. TO JOHN WASHINGTON, LIEUTENANT. GREETING.

By virtue of the authority to me by the King's most Excellent Majestye in this behalf given upon the good Testimony & Assurance which I have received of your Loyalty Integrity & Ability I do hereby nominate, Constitute and Appoint you the said *John Washington* to be Lieutenant of the Company of Gunners belonging to his Majesty at Annapolis Royal. You are therefore carefully and diligently to discharge the duty of a Lieutenant in the said service by duely exercising as well the inferiour Officers as the Gunners and other attendants belonging to the said Train in the Art of Gunnery and to keep them in good order and discipline and they are hereby required to obey you as their Lieut. and you to observe & follow such orders & Directions as you shall from time to time receive from me or the Master General of the Ordnance for the time being, the Lieut. General & Principal Officers of the same, the Governor or Any Officer in Chief Commanding the said Garrison, your Captain or any other your superior Officer according to ye rules & Discipline of Warr. In p'suance of the Trust hereby reposed in you and for your care and Diligence in the said service, you are to have & receive out of the Treasury of this office the sum of Five Shillings p. Diem to commence the 1st of January last and to continue during his Majesty's Pleasure. Given &c.

1st Febry. $\frac{1718}{19}$ (S^d^) Marlborough.

By Command &c. &c. &c.

CLIPPING BATTERY HORSES.

BY

COLONEL T. B. TYLER, R.A.

In publishing the following short article the Committee wish to make it known that they have received other papers on the same subject from Majors F. M. Bland, E. A. Lambart, and R. Bannatine-Allason, R.A.

These papers are all very good, and the Committee are sorry that the amount of space at their disposal precludes the publication either of them or of any further papers on the subject.

Major Phillpotts is quite right to state his objections to the arguments of Major Challenor as to the clipping of horses, but he should not imply that those who disagree with him are actuated by dishonest motives.

He observes that it is necessary to clip horses in India because the heat in the daytime, even in the cold weather, is considerable; but so, I would remind him is the cold at night, and great differences of temperature are very trying to horses. Cold after all is a relative term; in the hot weather in India we feel chilly when the thermometer suddenly falls to 70°, and when, after a cold spell in Canada, the temperature rises to 10°, we seem to be enjoying the climate of an English spring. Thus, though the conditions may be different, I think a horse suffers quite as much from cold on the picket lines in Northern India as he does in a stable at home. And the English horse in his own country is a much hardier animal than the Australian in India.

A horse's winter coat is designed by nature to afford him protection from frost and cold winds in the open fields, and is far heavier than is necessary to an animal living in a stable, and much encumbrance to one called upon to take strong exercise. If Major Phillpotts were obliged to wear a fur coat at all times during the winter he would experience considerable inconvenience when hunting or skating, and on five days out of six throughout the season besides. He contrasts the conditions of the life of the private horse with those of the trooper, and then protests "most strongly against the tendency to apply the test of peace time requirements to military matters and to judge soldiering from a civilian point of view." I fail to perceive the relevancy of this protest; we are discussing peace time requirements and the best method of keeping horses always fit for service, and to observe in this connection that civilians clip horses with satisfactory results is surely not judging soldiering from a civilian point of view. He asks how

clipped horses would fare on outpost duty after a rapid advance of some miles? I should think quite as well as a hunter who, after a fast run, has to stand for an hour or two outside a covert; but the two cases are not on all fours. The hunter is not only clipped, but his coat is never allowed to grow in the winter; a battery horse would be clipped, perhaps, twice during the winter, and, except for a few days after each clipping, would never be without a good covering.

Major Phillpott's account of his voyage to Romford "on the Free Ferry," though highly interesting, is not instructive on the point at issue, because none of his horses were clipped and comparisons cannot be drawn. He is horrified to think of clipped horses in "cold, cheerless, and draughty troop stables." Let me entreat him to visit his own stables at four o'clock on a cold winter's morning; he will, I think, find that the temperature is by no means what he supposes it to be, but on the contrary so genial that he will long to repeat the experiment. In Canada, when the thermometer stood at many degrees below zero, the battery stables were not cold at night, and the horses never suffered at all.

He remarks that his experience of unclipped horses leads him to believe that they are less liable to chest affections than clipped ones. It is unfortunate that he has not furnished the details of his experience with the latter—as Major Challenor has—we should then have been able to weigh one set of evidence against the other; still, though example is better than assertion, all discussion is wholesome. "He that wrestles with us strengthens our nerves and sharpens our skill. Our antagonist is our helper."

ATTACK OF A MODERN LAND FORTRESS.

BY

MAJOR H. P. HICKMAN, R.A.

The subject of this paper is one that contains so many and such complicated problems that it is a formidable one to attempt to discuss, and also a difficult one to condense within reasonable limits. In view of the enormous increase in the power and accuracy of siege ordnance in recent years, the history of even the latest sieges gives us no assistance in formulating our ideas; in fact, it becomes necessary to give some rein to the imagination and to break away from the trammels of tradition, keeping strictly in view what can and what cannot be done by modern ordnance according to recent experience. Much, therefore, in the following pages must of necessity be matter of opinion, and such opinions are advanced in no dogmatic spirit, but with the full conviction that the considerations on which they are based have not as yet received sufficient attention.

It will be convenient to divide the subject under the following main headings:—

(I.) A general description of the main features of the Defence.

(II.) The organization of a siege train and nature and employment of Siege Artillery Fire.

(III.) The general method of carrying out the attack.

I.—*Description of the probable Arrangements of the Defence.*

Typical Fortress.

A typical modern fortress may be defined as a town, dockyard or arsenal surrounded by a prepared fighting position having the points of main tactical importance occupied by permanent detached forts, the intervals between which will be filled in with field-works; the distance between the forts being probably from 3000 to 5000 yards.

The general line of these works will constitute the main defensive position, in front of which will be an advanced line of Infantry Defence which will probably be not further than 1000 yards from the forts: this line will consist of villages, farm-buildings, etc., placed in a state of defence, supplemented by field-redoubts and shelter-trenches, etc., where these can be constructed so as not to be of use to the besieger after their capture by him.

Opinions differ as to the disposal of the Artillery of the Defence, some Continental Powers still maintaining that its proper place is in the detached forts; it is generally conceded, however, that the Artillery must be entirely removed from them (with the exception of guns in

cupolas, turrets or armoured casemates) and placed in batteries in the intervals ("exterior batteries"); the reason being that the forts, as a rule, must occupy commanding situations and offer easy marks for the attacking Artillery, and any guns in them unprotected with armour would be quickly disabled; by removing them, also, the fire of the attack is drawn off from the forts.

Exterior Batteries.

If these exterior batteries are placed too far from the detached forts they run the risk of capture by a *coup-de-main*. We may expect to find them, therefore, more or less grouped round the Key-forts of the section of the defence to which they belong, and flanked and protected by their fire of Infantry, quick-firing and machine guns, supported also by that from the field-works in the intervals.

Detached Forts.

Of the types of detached forts to be met with, suffice it to say that they will vary between the simple earthen redoubt with parapet sloping into the ditch (which will be provided with an iron fence or other obstacle) and the more elaborate work with masonry escarp (or detached wall) and counterscarp, the ditch being flanked by caponiers or counterscarp galleries. All will have bomb-proof casemates for the defenders when not required to man the parapets, and guns may or may not be mounted on the ramparts. The more modern works are provided with a few guns in cupolas, turrets, or armoured casemates, but, with this exception, the tendency is for the detached fort to be merely an infantry keep; but as has been previously stated this is far from being universally the case.

As these forts will be at least 7000 yards from the town, in general the perimeter of the fortress will be about 25 miles, that of Paris being as much as 90 miles.

Ordnance of the Defence.

The question of the positions chosen for, and the use and employment of, the various natures of ordnance of the defence requires the most careful consideration, in order that we may arrive at a clear understanding of the problems presented for solution by the attack.

The ordnance may be classified as follows:—

(1.) The heavy natures of *guns* mounted in cupolas or turrets, on disappearing mountings or high-parapet carriages.

(2.) Heavy howitzers.

(3.) Movable armament of Medium, Field, Quick-Firing and Machine-guns.

(4.) Movable armament of light howitzers.

(The heavy howitzers in our service are included in the movable armament: they are not so classified here for convenience, as when movable armament is alluded to hereafter the more mobile pieces are meant).

Class (1.) *Heavy Guns.*—Now, with reference to *guns*, the first point that must most carefully be borne in mind is that they are *man-killing* weapons and that their *rôle* is shrapnel fire against troops or gun-detachments exposed, and that owing to the flatness of their trajectory they are in no case able to obtain the same amount of cover as howitzers.

If a heavy gun is to fulfil all the objects of its existence in the defence it should not only be available for long-range fire, but must also be able to sweep the approaches *close* to the main defensive line; for the latter purpose it must be mounted in an *exposed* situation giving command over this ground, or entirely resign the most important function of bearing on the "Close Attack." But the guns are removed from the forts because, admittedly, they are too exposed there and would be quickly destroyed: if they are retired behind the crest of rising ground they cease to bear on the close attack and can only be used for long-range fire in which there is little for them to do which cannot be equally well done by the light guns of Class (3), for it must be remembered that the Siege Batteries of the attack will be concealed behind rising ground and be safe from the projectile of a flat-trajectory gun, and even if visible their destruction is the *rôle* of the howitzers and not the guns.

The only alternative, if the heavy guns are to be used against the close attack, is to place them in exposed situations but to conceal their presence by bushes or other such means; but now they must remain inactive until the close attack commences, for even with smokeless powder the flash can be seen unless the gun be well behind the crest of rising ground, and the flash is sufficient to lay upon (even when the gun itself is invisible), and the gun could be destroyed if it opened fire during the early stages of the attack.

The logical deduction is that one set of guns is required for long-range fire and another to bear on the close attack: why not eliminate heavy guns in permanent emplacements entirely from the defence?

However, as we are dealing with the attack we may as well remember that at present in 99 cases out of 100 the heavy guns of the defence are *exposed* at all events to the extent that the flash of their discharge is visible, which is all that is required by the attack.

Howitzers of the Defence.

Class (2.) *Heavy Howitzers.*—The howitzers will be in concealed positions (behind rising ground) in the intervals between the detached Forts; they are for curved and high-angle fire against the Siege Batteries of the besieger and the defensive works of his investment line.

But as the Siege Batteries should be concealed it does not appear that they can be attacked even by the *howitzers* of the defence, and the latter should themselves be safe from attack for the same reason. They can, however, be used with certain effect against any ordnance of the attack which may be in exposed positions; but, as will be explained further on, it is only the light guns of the attack which need ever be exposed and then only during a decisive attack, or against sorties.

Light Guns of the Defence.

Class (3.) *Movable Armament, Guns.*—Similar remarks to those under the heading of heavy guns refer to positions for the light guns of the Defence, but they have the advantage over heavy guns permanently mounted, that they can be kept under cover and run out wherever required on an attack being made; they may be more numerous, causing distribution of the enemy's fire, and can be retired should an attack fail or prove to be only a reconnaissance, whereas a gun in a permanently exposed emplacement can be destroyed at leisure

by the Howitzer Batteries of the attack once its position has been disclosed by its opening fire.

Class (4.) *Light Howitzers.*—The light howitzers are expected to be useful in the defence by employing shrapnel, but the value of such fire is very doubtful. It must always be inaccurate, the bullets have a very low velocity and a small danger zone, and it would be extremely difficult, if not impossible, to regulate shrapnel fire from behind cover against troops in motion; it may be used with some effect against the light guns of the attack, and some further remarks will occur under that heading. It would also be an effective bar against approach by sapping.

Balloons.—These have frequently been spoken of as a very certain means of discovering concealed batteries and observing the effects of fire at them, but experiment has shown that they are not safe from shrapnel fire of field guns at a less range than 3600 yards, and at that distance and at a height of 1500 feet (which would, perhaps, be the limit for a captive balloon) the angle which an observer's line of sight would make with the horizontal would be 9°; that is to say, a battery within 70 yards of a hill giving 30 feet of cover would be invisible. Now this is an extremely small amount of cover, and the battery could be placed nearer than 70 yards with more certainty of concealment when using smokeless powder. In any case the experience of those who have tried observation of fire from balloons, is that it is of doubtful value even in very calm weather and quite impossible in a wind owing to the rapid motion. It is also quite a matter of opinion whether a balloon would be safe from Artillery Fire even at 4000 yards range; there is no reason why it should be considered so.

Even if the existence of a battery behind a hill is suspected, it can only be attacked by the very uncertain method of "pendulum fire" (successive rounds fired at different elevations on the chance of hitting). Balloon observation requires a clear view of the objective and exceptional conditions of weather, and its value under service conditions is probably entirely theoretical.

Entrenched Camps and their objects.

In concluding this portion of our subject it is well to remember what the chief objects of these large fortified places are. The French frontier defences, for example, are intended in the first place to delay an invader by obliging him to besiege one or more of the entrenched camps before advancing, thus giving time for the Field Armies to mobilize under cover of the fortress; and, secondly, as points on which an army, beaten in front, might retire, and from which, after being re-organized, it might again undertake offensive operations; but the regulations particularly enjoin that a Field Army is not to allow itself to be shut up in one of these entrenched camps, and one of the principal uses of their garrisons is to be able to undertake active offensive operations against the flanks of an invading army which may attempt to pass them. Passive resistance forms no part in the principles governing the design of the modern fortress.

Some stress is laid on this point because, when we come to consider the question of choice of positions for the Siege Batteries of the attack, and insist on the necessity for concealment, it may be objected that there

may be a wide level plain for miles round the fortress which will afford no concealment for the batteries. The garrison of such a fortress would have to be a purely defensive one, as the nature of the surrounding country would not lend itself to any active offensive movements against an invading army, and a small corps of observation would be sufficient to frustrate any attempted operations of the kind.

II.—*Organisation of the Siege Train and uses of the various descriptions of Ordnance composing it.*

The latest recommendations on the organisation of our Siege Train are that there should be two descriptions:—heavy and light; the former to consist of 8-in. B.L. howitzers, and associated with them a few 6-in. B.L. guns, if iron defences were to be encountered. The light train would consist of 6-in. B.L. howitzers only.

A Siege Train will be divided into units, probably of four pieces each, and so many units will be told off to form it.

Auxiliary Armament.

In addition, there will be an Auxiliary Armament of 20-pounder B.L. guns, field howitzers, and quick-firing and machine-guns, besides the field guns belonging to the Field Army.

Advantages of Howitzers.

The reasons why guns (other than those of this Auxiliary Armament) have been practically eliminated from the Siege Train are that, owing to the increased accuracy of the fire of howitzers of recent years, there is very little that a gun can do which a howitzer cannot perform equally well, if not better; and that against earthworks and masonry the howitzer is far superior from the great angle of descent possible, and the large bursting charge in the shells, which have become specially formidable since the introduction of high explosives.

Ordnance in concealed positions can be reached by curved howitzer fire, and behind earthworks and traverses can be destroyed without first cutting away the protecting earth.

Cupolas and Turrets.

High-angle fire with high-explosive shell and delay-action fuzes is capable of destroying any casemate as at present constructed, and it is not too much to expect that the same fire with quick-action fuzes will be more likely to put out of action guns in cupolas and turrets than the heaviest B.L. gun that can be taken with a siege train; for the projectile from the flat-trajectory gun at long range has not the necessary velocity to be any match for the heavy armour of these structures, and would probably glance off a cupola; an accurate gun may obtain a hit on the muzzle of the gun in one of these mountings, but the 20-pounder B.L. would probably be sufficiently accurate for this purpose, and a hit prove as efficacious as one from the 6-in. B.L. gun.

The howitzer shell can penetrate through the concrete round a cupola and, though General Brialmont observes that all that is necessary is to extend armour over this concrete, we have yet to learn what would be the effect on its mechanism of a 250 lb. shell containing 30 or 40 lbs. of high explosive dropping vertically on to the cupola itself.

Disadvantages of Guns in a Siege Train.

Guns in a Siege Train further labour under the very serious disadvantage of being unable, from the flatness of their trajectory, to secure the same amount of cover as howitzers which can be so placed behind rising ground that, with the assistance of smokeless powder, it

would appear that they may expect absolute immunity from attack from the beginning to the end of a siege, while the combined fire of the heavy concealed howitzers of the Defence can be brought to bear on the guns of the Attack.

This point of the absolute safety of concealed Howitzer Batteries of both Attack and Defence without in any way impairing the accuracy of their fire is a sufficiently startling one; for, if we accept the fact that our heavy siege ordnance should consist solely of howitzers, we are led to the conclusion that the *howitzer* of the Defence can take *no* part in the Artillery duel, and that the *guns* of the Defence cannot return the fire of their adversary because they cannot ascertain where he is and could not touch him if they did!

We have here nothing short of a revolution in siege warfare.

At all events they are sufficiently important considerations to point to the absolute necessity for concealment for the ordnance of the Attack; and, if this be obtained, it seems to follow that the necessity for the construction of Siege Batteries disappears and that nothing more will be required than good platforms and some light form of shelter to intercept stray bullets or splinters; field-magazines for the ammunition and night-arming also cease to be necessary.

Siege Batteries.

In any case, it is not easy to see the necessity for thick parapets for either batteries or redoubts; they can readily be breached by howitzer fire, although no gunner will be so foolish as to attempt to do so when he can drop his shell over them and destroy the gun or other objective concealed; the outer thickness of a parapet only serves to catch a shell which would otherwise burst harmlessly in hard ground, outside a thinner parapet; where splinter-proofs in redoubts are constructed beneath them, no doubt they serve a purpose by being made thick.

Nature of unit selected for Siege Train.

The question whether heavy or light units should compose the Siege Train, depends almost entirely on the state of preparation of the fortress, and the nature of its ordnance and character of their mountings. Whether the heavy or light units are selected, transport by road would hardly be practicable. It is more important to have a superior nature than to have a greater number of heavy ordnance than the defence, not only on account of the heavier howitzers doing work more rapidly, but on account of their greater accuracy, and consequently economising ammunition and transport. A large number will not be necessary if they are in concealed positions, as they can destroy the heavy ordnance of the defence in detail, but the possibility of the defender masking some of his guns till the close attack is developed must be allowed for, and a sufficient number of howitzers be available to open fire on them. Experience proves (as in the cases of Sebastopol, Danzig and Belfort) the dangers and reverses that accompany a siege commenced with insufficient resources; at the same time Continental Powers recognise that to bring up a regular Siege Train takes so much time, that an attempt should be made to curtail this period by having light siege ordnance (corresponding to our Auxiliary Armament), which can move with a Field Army, and be brought into action before the arrival of the Siege Train; and many writers advocate an attack by main force, preceded by a general bom-

Necessity for curtailing the time occupied in preliminary operations.

bardment by this light armament. Undoubtedly, should the defenders' works be in an unprepared state, it is quite possible such an attack might succeed; it would be made on all fronts of the place simultaneously, and would, at least, render it possible for the besieging Infantry to occupy a position close to the works, and facilitate the establishment of the heavy howitzers at effective ranges, when it is found necessary to bring them up.

Auxiliary Armament.

This indicates the necessity for the Auxiliary Armament being numerous, and as powerful as possible consistent with mobility, and it must be remembered that heavy howitzers, from the nature of their fire, can give no further support to the final Infantry attack than by keeping down the fire of heavy guns which may be unmasked, and by a general bombardment of forts and redoubts, to prevent them being occupied or their ramparts manned, and that a powerful Auxiliary Armament will be essential at this period.

Uses of the various natures of ordnance of the attack. Heavy Howitzers.

The heavy howitzers of the attack will be used for the following purposes:—

(1.) Dismounting or destroying heavy ordnance.

(2.) Destroying casemates and bomb-proof cover.

(3.) Destroying flank defences of ditches and obstacles.

(4.) Breaching detached and escarp walls.

(5.) General bombardment of works to prevent their being manned during the Infantry attack.

(6.) Night firing to prevent re-arming.

Effect of Howitzer fire.

Howitzers fire common shell with large bursting charges, and if a high explosive be used their effect is enormously increased, a typical Twydal casemate having been completely breached by two rounds from a 6-in. B.L. howitzer. Owing to the large number of pieces into which a high-explosive shell breaks up it has a distinct value also as a man-killing projectile, as has been proved by recent experiment; so much so, in fact, that it is difficult to see how a fort or redoubt could be occupied at all under a heavy bombardment with such projectiles which, it must be remembered, can continue (owing to the curved trajectory) until the attacking Infantry have arrived on the glacis of the work; the latter cannot be said of shrapnel fire from flat-trajectory guns, although, as long as it can continue, it can prevent the manning of the parapets. Howitzer fire should prevent the works being occupied at all, and the defenders will have to seek safety outside, and trust to manning them, if possible, at the last moment.

Bombardment of forts and redoubts.

Breaching possibly unnecessary.

This raises the question whether breaching the escarp or detached wall will be necessary; the Germans carry flying bridges with their siege equipment for crossing ditches under favourable circumstances.

Ranges for breaching Batteries.

Should breaching be necessary, the projectiles will require, for a modern ditch, an angle of descent of 35° to 40°, to attain which howitzers require a range of not much *less* than 2500 yards, as at shorter ranges too small a charge would have to be employed.

Vertical fire.

The modern howitzers can employ vertical fire at angles of elevation

up to about 70°, for destroying casemates and ditch-flanking defences, the projectile descending almost vertically.

There is an impression in some quarters that howitzer fire is inaccurate; nothing could be more fallacious than to suppose such a thing, and those who base their theories of Attack and Defence on such an assumption will make a dangerous mistake. Even the M.L. howitzers have been made to shoot with great accuracy at ranges up to 4200 yards, although compared with the B.L. howitzers they fail in shell-power, and their mountings are not adapted for high-angle fire, nor can smokeless powder be used with them, and these are the considerations that condemn them and not their shooting. The accuracy of the B.L. howitzers will, no doubt, be still further increased by attention to points connected with the mounting which have so much to do with good shooting.

Observation of fire.

A system of observation of fire, simple, rapid, and accurate, is one of the first essentials in carrying out accurate fire from the howitzer batteries; we have such a system in our service, but want of space prevents any description of it being given. In this system non-commissioned officers can work the observing and plotting instruments, the observing stations need not be visible one from the other, the base between them need not necessarily be measured, nor are plans or maps now used, although these should be supplied to each Battery Commander as they will be useful in many ways. Observation of fire is as accurate by night as by day, and it follows that ranging can be equally well carried out in one case as in the other.

Auxiliary Armament—*Guns.*

The Auxiliary Armament would be mainly employed as adjuncts to the Infantry attack on the advanced posts and main position; the 20-pr. B.L., field, and quick-firing guns would employ shrapnel against troops and guns exposed in any way, or to prevent the manning of parapets of field entrenchments during the attack, also for the general bombardment of villages and other defensive posts; with the addition of machine-guns they would also be employed in repelling sorties.

Except in the final attack on any position by the Infantry, when these guns will have to be massed more or less in the open, or with only such cover as gun-pits, etc., will afford (and when they will have to sacrifice themselves, if necessary, in support of the attack), indirect fire from behind cover will have to be largely resorted to or they may fall an easy prey to the fire of the concealed light howitzers of the defence; the necessity of instruction for Field Batteries in this class of fire in peace time is obvious.

Field Howitzers.

The *rôle* of the field howitzer is clearly indicated as for curved and high-angle fire, of common shell with high explosive against villages and buildings in the advanced Infantry line and field casemates (and over-head cover generally) in the field-works; this fire is capable of rendering field redoubts untenable and destroying obstacles, and can be continued up to a very late period of the Infantry advance.

It would undoubtedly be capable of disabling or dismounting any of the ordnance of the defence unprovided with armoured protection or very heavy over-head cover, and its value can hardly be overrated, both as an adjunct to the Infantry attack and as an auxiliary to the heavy

howitzers, when it is not desirable to waste the heavy shell of the latter on minor tasks.

Field Howitzer Shrapnel.

To employ it for shrapnel fire is to sacrifice a proportion of its usefulness. The engineer of the defence will be wise if he provides both guns and Infantry with efficient protection against shrapnel fire, and high-angle shrapnel is not efficient against loop-holed walls and parapets, though percussion shrapnel from high-velocity guns is. In any case, the high explosive *common* shell of this howitzer has great power as a man-killing projectile, and is probably more to be relied on for that purpose than a low velocity shrapnel.

Batteries will not have to be constructed for these howitzers, although some form of light splinter-proof and also platforms are certainly desirable for those in the more permanent positions, assuming them to be, of course, in concealed situations. As their objectives will be various, and their handling have to conform to the exigencies of the Infantry attack and the ever-changing development of the defence, their fire will have to be directed by visual observation, as with Field Batteries, though instruments might be employed if occasion served. The question whether platforms of some description should not be provided for Field Howitzers when acting with a Siege Train is one that certainly requires careful consideration.

III.—*General Method of Carrying Out the Attack.*

The Attack.

Advance of the Field Army.

The fact of a siege being undertaken assumes the absence or retreat of a hostile army. The advance of the Field Army would generally be on a broad front in two or more columns, the flanks being protected and concealed by Cavalry screens.

The Defender is not likely to undertake offensive operations at any great distance from the fortress; at Danzig such operations were disastrous to those engaged, and at Belfort they failed to delay an advance made with very weak forces; experience proves that they should not extend beyond the effective range of the guns of the fortress, except in the way of Cavalry observation, at a distance of not more than a day's march.

Preliminary blockade position.

The besieger will then enclose the place by a blockading line to cut off supplies and communication with the surrounding country; the question whether he shall at once close in his forces and complete the "close investment" will depend on—

(1.) The strength of the works and power of the ordnance of the defence.

(2.) The character of the Infantry defence, and whether his advanced posts are pushed far to the front.

(3.) The besieger's own strength, and the power and number of ordnance of the Auxiliary Armament present with the Field Army.

Close investment.

Belfort may be cited as an example of the danger of too close an investment with an insufficient force of Artillery.

Assuming the conditions to be favourable, the investment line will be closed in by a general advance on the fortress, strongly supported

by all available Artillery, the defender's Infantry being driven in on their advanced line of defence, which will be about 1000 yards from the forts.

It is at this point that some writers recommend the advance being continued at all points and an attempt made to take the place by storm (*see* previous remarks). However, assuming this not to be advisable, the besieger will proceed to entrench himself strongly in his present position, called the investment line, field fortification being largely employed and emplacements provided for guns to bear on all possible lines of approach by sorties.

It is not to be supposed that this position will have been won or be maintained without severe and repeated engagements.

Choice of front to be attacked.

The choice of the front to be attacked will, by this time, have been made, and will be guided by considerations as to the "key" positions or forts which should be captured to ensure the fall of the place, but also, to a large extent, by considerations of transport, for a railway is essential for bringing up siege material.

Field Arsenal.

A situation for a Field Arsenal or Grand Park will be selected on the main line of railway, and out of sight and range of the nearest works of the fortress, *i.e.*, not less than 8000 yards' distant. As three contiguous detached forts will probably have to be included in the attack, the artillery position will be an extended one, and to arm and keep the batteries supplied it will be necessary to decentralise the Artillery Parks. Intermediate depots for the batteries will accordingly have to be provided, corresponding to the number of "Attacks" into which the main attack is divided, each having its own depot under the orders of the C.R.A. Both the Arsenal and the depots will be strongly defended by field-works against any possible attack, and the depots will be as close to the batteries they serve as may be consistent with safety; probably about half-a-mile in rear.

Intermediate Depots.

Communications.

The difficulty of transporting heavy howitzers and their ammunition is so great that at least trench tramways will have to be provided from the Field Arsenal to each depot, and also from the depots to the batteries; it does not appear to be possible to carry the railway gauge of the country beyond the Field Arsenal, except under abnormally favourable conditions of ground, which are hardly likely to exist, and as there must be a change of gauge at some point, the Arsenal would seem to be the best place for it.

Positions for Batteries of the attack.

The batteries or emplacements for the heavy howitzers and guns (if any) will now be constructed, and the choice of positions for them is of such vital importance that we must carefully discuss this question.

Concealment is essential, and they must be situated behind rising ground or woods: in the former case care must be taken that they are so placed that the projectiles can clear the crest in front at the lowest angles of elevation at which they are likely to be fired; and in the latter, the only satisfactory position is behind the flanks, so that the line of fire for the howitzers can be obtained by the usual methods from positions close to the batteries and clear of the wood.

Batteries placed in exposed situations will be quickly destroyed by the fire of the concealed howitzers of the defence, and a very small

amount of cover gives concealment with smokeless powder. The employment of this powder gives enormous advantages to the attack, for the defender *must expose his guns* if they are to bear upon the *close attack*, and heavy guns mounted as at present in permanent emplacements giving command over all the approaches to a fortress are only useless encumbrances which will be quickly destroyed unless heavily protected with armour; if placed in more rational positions, retired behind the crest of rising ground, their usefulness will be limited to long-range fire.

The defender will have to recognise these principles sooner or later, and the besieger, therefore, may expect, when he makes his final assault, to have to deal with a powerful array of *mobile* light guns suddenly run out into exposed positions to bear upon the close attack; and to silence these guns will be the task of the Auxiliary Armament of the Siege Train.

Ranges of Batteries of the attack.

The first batteries of the attack will have to be probably at ranges of not much under 4000 yards from the line of forts; but if the investment was carried out with sufficiently strong forces, and the defenders vigorously driven in on to their advanced posts, it is quite possible that they may be at shorter ranges, given that there are suitable positions there for the batteries.

In any case, even the heavy M.L. howitzers can make excellent practice at over 4000 yards, as has been proved by experience, and the B.L. howitzers should certainly do so. With curved fire, naturally some slight loss of accuracy is to be expected as the range increases; but with *vertical* fire it is necessary at the shorter ranges either to reduce the charge or *increase* the elevation to an abnormal degree, and one may safely predict that greater accuracy will be obtained at long range with the heavier charge and more reasonable angle of elevation which may then be employed.

With this question of the comparative accuracy at long and short ranges is bound up another most important one: whether it will be necessary to have any second artillery position, as has been laid down by all authorities on the subject, even when they assume the first position as about 2500 to 3000 yards from the forts.

Objections to a 2nd Artillery Position.

For my part, I should not recommend moving any heavy howitzers from their first position if it be under 4000 yards' range, and, if more than that, then only if it were found that their fire could not attain its object. For it must be remembered that the slight increase in accuracy gained by moving them in is counterbalanced by the following disadvantages:—

(1.) Difficulty of transporting these heavy weapons.

(2.) Increased difficulties in bringing up ammunition and supplies.

(3.) Probable difficulty in obtaining concealed positions at the shorter ranges.

(4.) The fact that in their first positions they have ascertained the ranges of most of the important objectives.

(5.) Their employment in the later stages of the attack would be confined, to a great extent, to a general bombardment of the forts to prevent their being manned, and this can be done at long ranges.

(6.) That at short ranges the necessary angle of descent for breaching will probably not be attainable.

(7.) Commanding ground for observation of fire is more likely to be obtainable at long ranges, and the observers would run considerable risk at short ones.

There is nothing, however, to prevent heavy howitzers being pushed forward when occasion demands, should favourable positions be found for them as the attack progresses, or should it be found that some risk must be run for some special purpose.

The above objections do not hold to the same extent for the field howitzers, which, in the earlier stages, would be employed chiefly against the advanced infantry posts (1000 yards nearer than the objectives of the heavy howitzers), and which could, and must be, pushed forward in the later stages of the attack.

Bombardment of the Defences. Heavy Howitzers.

The bombardment of the defence by the Siege Train will now be commenced, and sufficient ammunition for five days should be available at 100 rounds a-day per piece. The fire of the heavy howitzers would at first be confined to attacking all ordnance which is sufficiently exposed for their position to be located.

Artillery Duel.

Nearly all writers recommend that the full artillery power of the defence should be thrown into this duel; but they overlook the fact previously mentioned, that there will be nothing for it to fire at if the attacking batteries are well concealed, and that every exposed gun that opens fire can be quickly destroyed; therefore, the defenders should carefully mask their guns and reserve their fire until the infantry attack commences. Should they be sufficiently well advised to adopt these tactics, there appears to be nothing for it but to commence the bombardment and attack of the advanced infantry position by the Auxiliary Armament and infantry, preceded and accompanied by a heavy bombardment of the detached forts and redoubts by the heavy howitzers: should the artillery of the defence still reserve their fire the advanced posts may be captured, but should they open fire and so disclose their position, the howitzers must at once turn their fire on them; and here great stress must be laid on the vital importance of rapidity in our methods of obtaining the line and ranging with howitzers: any delay at this critical juncture means heavy loss to the infantry, while success means that, not only will the advanced posts be carried, but that should the defenders be sufficiently demoralised the attack may be pushed home against the main position with every chance of terminating the contest by its capture.

Should there be any doubt as to the possibility of capturing the main works by such a *coup-de-main*, the infantry will entrench themselves strongly in the captured infantry positions; the Auxiliary Armament will have been already pushed forward to their support, and the breaching of the escarps of the detached forts must be commenced without

any delay and accompanied by a further bombardment, if deemed necessary, for destroying casemates and ditch flank defences.

It will be a difficult task for the infantry to hold their present positions against the fire of the concealed howitzer batteries of the defence, and they will have to be withdrawn slightly, but without losing their hold of them; during the night fresh defences may spring up, fresh guns be brought up and new emplacements armed: delay will be disastrous and the assault should be pushed home at all hazard.

To say that from here the attack must proceed by the old routine of approaches and parallels is to ignore the new conditions imported into the attack by the concealed howitzer and the modern gun.

Engineer Attack.

The Engineer attack is either absolutely impossible or unnecessary: if heavy guns still remain bearing on the close attack, sapping is an *impossibility* (and, in any case, howitzers with their curved fire can render it so): if the guns do *not* exist, where is its necessity? As well say that the final attack of infantry on a field position should be made by sap.

No! There must be no dwelling in the advanced infantry position: the attack must be pushed home under a concentrated bombardment from every gun and howitzer of the attack.

But the great essentials towards the success of such a vigorous method is an ample and powerful Siege Train and a plentiful supply of ammunition, with a carefully arranged system of Fire Control. *Without great strength and a vigorous use of that strength it is useless to attempt to besiege a modern fortress.*

On the infantry will fall the brunt of the fighting, though their success may depend on the support afforded by the Siege Artillery, and from the latter is required, not only a high standard of technical training, but also a thorough knowledge of the tactical problems to be solved by the two arms combined.

GIFT OF DICKSON MANUSCRIPTS AND NOTES

TO THE

ROYAL ARTILLERY INSTITUTION.

The following letter from General Sir Collingwood Dickson, V.C., G.C.B., to the Deputy-Adjutant-General, Royal Artillery, describes the feelings of *esprit de corps* and filial affection which have led him to place at the disposal of the Institution the valuable collection of MSS., Notes, and works on military matters, made first by Sir Alexander Dickson and continued by himself.

The Committee are deeply grateful to Sir Collingwood for the gift, and to H.R.H. the President of the Institution for committing to their care such a mass of historical treasures, and they hope they may prove themselves worthy of the trust confided to them.

The letters and papers are contained in four large chests; the contents of one only of these (No. 1) have been briefly inspected and catalogued, and the Committee have instructed the Secretary to proceed forthwith in the inspection, indexing and cataloguing the contents of the other three boxes.

Box No. 1 contains 74 books, ordnance works and bundles of MS. works, on such various subjects as the following:—

1720–1750. MS. book. European Treatises, Synopsis of.

1756. MSS. Byfleet Royal Camp. Details of Ordnance, &c.

1782–1802. Public Letters and Orders for R.A., Index to.

1793. MS. Toulon, Evacuation of.

1793. Colonel Lawson. Ammunition for R.H.A. going into Camp.

August 1798—July 1799. MS. Gibraltar, Minorca Expedition, Journal of Lieutenant and Adjutant Dickson.

1799. Bound volume of MSS. Voyages, Sieges, &c., various, from 1799. Notes.

1800. MSS. Malta. Diaries of original correspondence at siege and capture.

1781. Herald's scroll of Coat-of-Arms granted to Captain Thomas Ross, R.A., for distinguished services.

1808. MSS. 1 Bundle. Expedition to Portugal—Battle of Olivença.

1809. MSS. 1 Bundle. Pursuit of Soult in Portugal—Expedition to Walcheren, Bells of captured Fortress (Flushing) claimed by R.A. disallowed by Law Officers of the Crown.

1810. MSS. Portugal. Diaries. Letters from General and Portuguese officers. Memo. of conditions of service of British officers in Portuguese Army.

1811–14. 12 bundles of letters from Captain A. Dickson to D.A.G., R.A. relating to Portugal, sieges of Salamanca, Cuidad Rodrigo, Burgos, &c., Bidassoa, St. Jean de Luz, operations in France, battle of Toulouse, expedition to New Orleans and battle of Orthes.

"79, Claverton Street,
London, S.W.
19th July, 1894.

Dear General Lloyd,

I beg to acknowledge the receipt of your communication, dated Horse Guards, W.O., 7th July, 1894, R.A. Nos. $\frac{33}{11}$, and in reply I have to request you to be good enough to convey to His Royal Highness the Field-Marshal, Commander-in-Chief, my most respectful acknowledgment of the gracious and kind terms in which he has expressed his sense of the value of the gift I have just made to the Royal Regiment of Artillery (the collection of MSS. and professional papers of my late father, Major-General Sir Alexander Dickson).

It has afforded to me very great pleasure and gratification to receive the thanks of His Royal Highness, and through him that of the Royal Regiment of Artillery, for this gift.

I cordially agree with the decision of H.R.H. to entrust this valuable collection to the custody of the Royal Artillery Institution, and to obtain the services of a willing and qualified officer to edit these MSS., &c. with a view to publication.

I would venture to suggest that, in the first instance, the Committee of the R.A. Institution should make a general examination of the MSS., &c. with a view to decide as to the best mode of carrying out the decision of H.R.H. and his recommendation as to their publication in consecutive order.

In conclusion, I beg to express my sincere hope that these MSS., &c. may be properly utilised for the benefit of the Regiment, as well as in the illustration of the good and glorious services of the Royal Regiment of Artillery, during the wars and campaigns of the period in which the writer took part.

They will record again and bring to light how well and with what intelligence, zeal, and gallantry the Royal Regiment of Artillery gained the highest distinction and added to its great reputation.

Believe me,

Yours very faithfully,

C. Dickson,
General and Col.-Commdt., R.A."

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"FLOATING DEFENCE."

BY

LIEUT.-COLONEL SIR G. S. CLARKE, K.C.M.G., R.E.

Nothing is more injurious to progress than a taking phrase. The theological development of a mind to which the mere name "Mesopotamia" brings comfort and satisfaction can scarcely be either rapid or well directed, and among the many "blessed words" which have retarded the solution of naval and military questions, none have proved more efficacious than "Floating Defence." Delightfully vague, poetically suggestive of gliding movement over calm waters, the term is exactly calculated by its soothing appeal to the imagination to hypnotise the reasoning faculty. While, therefore, we tacitly agree to avoid discussing its meaning or seeking to lay down the scope and the method of its application, the phrase runs through our writings, appearing and re-appearing like an alluring refrain to which we wag our heads in mechanical appreciation. Thus the whole subject has escaped critical study; its principles remain undefined; and in the rare cases where a partial practical experiment has been carried out, failure has generally resulted.

In a short paper written many years ago, Sir J. Burgoyne justly complained that "while floating batteries of some kind always form an ingredient in the demands and projects for the defence of every estuary, no well-defined practical mode by which they are to be provided has ever yet been prescribed." And with that thoughtful common sense which was his marked characteristic, he proceeded to consider the question from the point of view then attainable. Block-ships, "the only distinct means hitherto prepared or decided upon," are objected to on unimpeachable grounds. They are too costly and too difficult to maintain, except in position where "they would be least wanted;" they have "little, if any, advantage over the enemy's ships of war;" finally, and most conclusively, "very few or none would be forthcoming in time of need." As a substitute for the largely non-existent block-ship, Sir J. Burgoyne refers to "steam gun-boats, or, still better, the floating batteries with their sides coated with thick iron plates," which, however, are open to the grave objection that they "would necessarily abstract, in some degree, from the many resources in men, &c. that are peculiarly required at the breaking out of war." The arming and manning of local private steamers would "also have many inconveniences."

There remains the plan of "separating the battery from its moving power" and utilising vessels "of any form, power, draught of water, with any modes of protection . . . . as may, on thorough trial, be found best for different classes of station." The "moving power" is to be supplied by local steamers, and the floating battery, "being armed, might remain at anchor at very little cost," while crews would be provided from "local forces on the spot." Such batteries are to be "moored in advantageous positions," and would be specially applicable "at the great commercial ports that are within wide expanded inland waters, such as Liverpool, Glasgow, Hull, &c., where the constant presence of a flotilla of men-of-war, large or small, would be out of the question."

This comparatively definite proposal, however open to criticism, might have served—at the time when it was put forward—as the basis of an intelligible policy. Subsequent developments of steam, guns and armour, together with the uprising of the torpedo-boat and the extraordinary modern demands of submarine mines, have complicated the question. Floating defence is no longer a matter of block-ships or of moored batteries only, but of armour-clads, gun-boats, torpedo-boats, armed steamers, guard-boats, and look-out ships, to be used singly or in combination, as a stationary or as a manœuvring force, locally or Imperially provided, administered by the Admiralty or by the War Office, or under some undefined and undefinable joint arrangement. The "blessed words" cover all this, and we contentedly use them to conceal the conflict of incompatible conditions, the immense practical difficulties, and the utter uncertainty in which the whole subject is involved. Now, as when Sir J. Burgoyne wrote, floating defence forms an "ingredient" in our projects. Now, as then, it exists principally on paper.

The United States' "Board on Fortifications," in proposing[1] an expenditure of £3,775,000 on floating defence for New Orleans and San Francisco, adopted the following definition :—

> "In the phrase 'floating defences' just used, the armoured sea-going ship of the Navy is not referred to. . . . . The floating defences mean floating batteries designed specially for operating in harbours or close to the land—armoured more heavily and armed with heavier guns than any probable adversary. Of considerably less draught than the armoured sea-going ship, they could, by operating among the shoals, avoid ramming, and even torpedoes. To gain such advantages speed must be sacrificed, but it is quite evident that for the defence of harbours and bays the advantages of extra thickness of armour and of superior power of gun more than compensate for that loss."

Such a definition evidently fails in comprehensiveness at the present time, and scarcely sufficed even for the proposals of the Board, which included a further sum of £1,944,000 for torpedo-boats intended for the local defence of thirteen specified ports. In an Appendix, Commander W. T. Sampson, U.S.N., defines "floating coast defences" as consisting of "(1.) floating batteries; (2) gun-boats, and (3) torpedo-boats, the essential difference between the first two consisting in the size and amount of protective armour." He proceeds to propose five types,

[1] In 1885.

designs for which are given, fulfilling the conditions tabulated below :—

Type.	Tonnage.	Armament.	Maximum speed.	Knots at maximum speed.	Knots at economical speed.
1st Class Coast Defence Ship	7000	2—16-in. B.L. 1—10-in. B.L.	15½	465	1900
	6500	2—14-in. B.L. 2—10-in. B.L.	15¼	435	1750
2nd Class do, do. ...	4000	2—12-in, B.L. 2—10-in. B.L.	13	510	1300
Gun-boat	300	1—10-in. B.L.	10	480	1000
Torpedo Gun-boat ...	128	2— 5-in. B.L.	15	—	1090

These proposals well illustrate the difference of the point of view. The application of the term "floating defence" appears to be unduly extended, and the 1st class coast defence ship becomes virtually a 2nd class battle-ship. Special qualifications for action in inland waters seem to have practically dropped out of sight, and the whole question becomes entangled in that of the composition of the fighting navy.

Before any useful discussion of floating defence can be attempted, it is necessary to arrive at a clear definition of what is implied. Failing this, a hopeless see-saw of ideas is inevitable; or, to adopt another metaphor, we shall find ourselves endeavouring to ride two ill-assorted horses at the same time.

A further limitation, however, must be introduced, in order to arrive at a practical issue. The question must be dealt with from the point of view of the British Empire. The harbour defences of other Powers have nothing to do with those of our own. What may conceivably be good policy for France, Germany, Russia, and the United States supplies no guide for us. Mere imitation, in such a case, is the most expensively superfluous form of flattery. While we must carefully watch and weigh the offensive preparations of other nations, and while their floating defence may perhaps have to be regarded from the naval point of view, the standard and the means of protection of our own ports cannot be copied from foreign models.

Floating defence, for present purposes, is therefore strictly limited to craft of all kinds, operating from a single port for the defence of that port, and controlled by local authority. So defined, it is, in war, a force apart altogether from the sea-going navy. Its elements are not necessarily incapable of action at sea; its distribution may be varied during the course of hostilities; but the condition remains that, when attack threatens, it is held in readiness for specific local action, and that its directing authority resides in the threatened port.

The functions of the sea-going navy are pre-eminently strategical. Subject to general instructions, its movements are controlled by

authority afloat and are susceptible of frequent and unexpected changes over wide areas of sea. The functions of fixed defences are essentially tactical, and are rigidly restricted to action over a known and predetermined area. Keeping this definition and this distinction clearly in view, the subject can be approached, and the questions which present themselves are:—

1. Under what local conditions are floating defences calculated to bring effective aid to the protection of a British port?
2. What class of vessel can be usefully employed and what functions can be profitably assigned to each?

So long as fighting on the seas was carried on in small craft, floating defence proper can hardly be said to have existed; but when deep draught sailing ships became the staple of navies, the small vessels were still retained for action in shallow or confined waters. Blockaded at Rhodes in 1480, the Knights of St. John sought by small fire-ships to injure the Turkish fleet. This rudimentary application of floating defence failed; though the siege was raised for other reasons. The Russian siege of Azof in 1695 failed, because the Turks were able by light draught vessels to keep up communications between the beleagured town and the fleet. Peter the Great, having with characteristic vigour accomplished the construction of an armed flotilla on the Don, the Turkish communications were severed, and in 1696 the place fell. The floating defence of Azof proved inadequate to repel Peter's flotilla.

Where mortar-boats were employed for bombarding purposes, it was sometimes considered necessary to support them against the action of small craft. Thus, before Cadiz in 1797, Nelson, who had placed "the *Thunderer* bomb" within "2500 yards of the walls," writes:[1] "The Spaniards having sent out a great number of mortar gun-boats and armed launches, I directed a vigorous attack to be made on them. . . . . I have the pleasure to inform you that two mortar-boats and an armed launch remained in our possession." Floating defence appears to have been singularly ineffective on this occasion.

The naval situation in 1779–1782, which enabled the siege of Gibraltar to be undertaken, naturally conduced to the employment of floating defence. To the mortar-boats, rowing gun-boats and other light craft which the Spaniard could employ, were opposed twelve gun-boats built on the spot, brigs "cut down and converted into prames," together with frigates left by the fleet and used as floating batteries. At Copenhagen in 1801, there were, apart from the dismantled battle-ships, "ten pontoons or floating batteries, one bomb-ship rigged, and two or three smaller craft."[2] This formidable if immobile floating defence proved unavailing.

At the beginning of 1812, when the navy of France was practically reduced to privateering operations, and attack across the sea was impossible, Great Britain, with that curious inability to realise her own strength which seems characteristic, maintained costly and absolutely useless defensive flotillas at Messina and Zante. The following extracts

[1] To Sir J. Jervois, 4th July.

[2] Report by Colonel Stewart.

from an interesting letter of Captain Robert Hall, R.N., to Lord Cochrane[1] serve to illustrate a phase of national imbecility which it is to be hoped will never recur :—

"I am serving here in an amphibious way—having the rank of brigadier to command an 'army flotilla!' but why it should be an 'army' one I cannot find out . . . . . There is an immense naval establishment here of a hundred and forty vessels of different discriptions quite independent of the Admiral! These are maintained by the British Government at an expense of about £140,000 per annum . . . . . The island of Zante has another flotilla of 60,000 dollars to protect it, and the Commandant of the barren rock of Lissa—not content with his gun-boats—sent in the other day a serious memorial, stating the necessity of defending his island by placing gun-boats *all round it*, wherever there were no guns on shore! If this flotilla mania should reach our West India islands, what will be the consequences? At least, I should think, as army matters are conducted, an expense equal to one half that of the whole navy . . . . Figure to yourself eighteen subalterns of different regiments commanding divisions of this flotilla! When I took it out to sea, they were all sea-sick and . . . about the decks. . . . . The army officers appointed to command one of our vessels mislaid what he called the 'route given him by the Quartermaster-General,' 'lost his way,' as he expressed it, and got ashore in the Gulf of Squillace. On his exchange, he reported to me that 'the night was so dark he could not see the rock on which the vessel ran!' and that when fast *a board broke in her bottom*, so that the water ran in so fast he could not *scoop it out* again.' Thus it is that Mr. Bull is humbugged."

What could better illustrate the folly of soldiers seeking to play at being sailors, or the extent to which the floating defence mania may be carried.

At Sebastopol, *sunken* defence prevailed, and there was no opportunity for the employment either of floating batteries or light craft. While the history of war, down to the age of steam, affords many instances of a resort to floating defence, they were usually due rather to chance than to deliberate design, and nothing approaching to system appears to have been evolved, except in the ludicrous cases referred to by Captain Hall. Where small craft were present in a port or a river, they could, and frequently did, engage any similar craft employed in the attack. Where vessels were unable to take the sea they could be moored and utilised as floating batteries. Where a nation was reduced to fighting in interior waters, its naval force became in effect floating defence.

In the irregular and wholly uninstructive operations carried on by the Allies on the rivers Parana and Paraguay, the Paraguayans having no navy were driven to temporary expedients, and the "gun-flats" which played a part in the little action of Riachuelo came fairly within the definition of floating defence. In the American Civil War, the conditions were similar. Having no navy, the Confederate States were restricted to fighting in inland waters with small vessels specially built or adapted for the occasion, and by the force of peculiar circumstances floating defence approached to system. Thus, at New Orleans and at Mobile, small steamer flotillas were held ready to assist in the defence of channels. Posted behind a line of batteries, mines or obstructions,

[1] Dated Messina, 14th January, 1814.

they were intended to engage the Federal squadrons during the disorder caused by the passage. Although the results were disastrous in both cases, the "general idea"—from the point of view of the Confederacy—appears well founded. In 1870, the German Baltic and North Sea ports contained small gun-boats[1] which might have found chances of employment if Admiral Bouët Willaumez had disposed of similar craft; but, as under the then existing naval and military conditions, no serious attack on a German port was possible, the capabilities of floating defence could not have been effectively tested. Since 1871, the great development of torpedo-boats and of submarine mines has given a new aspect to the question. The torpedo-boat is claimed as a new weapon specially adapted for harbour defence; a flotilla is sometimes required—on paper—for the protection of the submarine mine. Meanwhile the increased effective range of coast artillery and the adoption of quick-firing guns have introduced new considerations.

The possibilities with which floating defence is now vaguely credited may be divided into two categories, viz.:—

A.—Defence of the exterior waters of a port—its sea approaches.

B.—Defence of interior waters.

A.—For the defence of exterior waters, block-ships or floating batteries of any form are clearly useless. If moored, they have every disadvantage; if capable only of slow movement, they cannot fight on equal terms with the vessels of which the enemy—if he attacks at all—must necessarily dispose. If of such a class as seems to be proposed by Commander Sampson,[2] their proper place is evidently with the manœuvring fleet. Only a Power which could not maintain a fleet at sea would thus weaken the fighting line by tethering ships to a harbour. If driven into port temporarily or definitively, the fleet itself will supply this branch of floating defence. For Great Britain, which, as is now beginning to be realised, must command the seas or perish of suffocation, the so-called coast defence vessels *Gorgon, Cyclops,* and their hideous sisters are absolutely worthless in exterior waters. Launched on some passing wave of misconception, or due to a policy borrowed from the foreigner, they are a source of wasteful expenditure in peace, and would sensibly weaken the fighting navy if provided with crews in war. Unarmoured gun-boats, however fast, are obviously unfitted for the protection of exterior waters, since they would be puny antagonists for the vessels which they must necessarily be called upon to encounter.

Thus far history is a safe guide; but the torpedo-boat is regarded as a new factor lying outside of the experience of the past. Have we here a powerful "ingredient" to add to the allopathic mixture labelled "Coast Defence?"

Night, thick weather, or powder smoke, combined with moderately calm water, appear to be regarded as essential to the effective action of torpedo-boats. Given these favouring conditions, it is generally believed

[1] A little gun-boat coming out of Dantzig is stated to have attacked the *Surveillante* on the night of the 30th July, but without any result.

[2] *See* table, p. 483.

that they would render a close blockade by night difficult, if not impossible. Such naval dispositions as are described by Hobart Pasha in his account of blockade running at Wilmington—comparatively ineffective as they proved—could scarcely have been maintained in face of a torpedo-boat flotilla vigorously handled. On the other hand, blockades obviously cannot be attempted by the weaker of two naval Powers, and to seek to avert them by local measures is emphatically not the policy of Great Britain. Again, torpedo-boats could not possibly prevent a raid with a view to bombardment, if such a proceeding were really likely to commend itself to our enemies. Nor would the observation or reconnaissance of a port be rendered impracticable by their presence in any reasonable numbers. In the case of distant Colonial harbours, such as Singapore, Hong Kong, Melbourne or Auckland, a *Cecille* or a *Rurik* haunting the exterior waters, could not possibly be driven off by any form of floating defence. Whether the steam trade of these ports could be effectively interrupted by such means is extremely doubtful in view of the experience of the Confederate blockade-runners; but occasional captures would probably be made so long as the hostile cruisers could maintain their stations. Thus the protection of the port from this highly probable form of danger must depend absolutely on the action of the navy.

There remains the question of look-out vessels, whose employment for local objects has found advocates. By night, no useful purpose can thus be served. A local steamer, stationed or cruising off Malta or Melbourne, would either discover nothing or ensure her own capture. By day, the utmost that could be accomplished would be warning briefly anticipated. Communication between the look-out ship and the shore could perhaps be maintained over 12 miles. Having waited to make out an enemy, the only course would be to retreat at full speed. When it is remembered that any high land in the neighbourhood commands a far more extended view than can be obtained from a ship's crow's nest, it seems probable that the utmost gain would little exceed half-an-hour—a period which would scarcely be of real importance to any well organised port. The cult of the look-out ship is probably founded upon some false military analogy, some restricted system of outposts or patrols which has no parallel on the seas. The general conclusion appears inevitable that the advantages of floating defence in exterior waters are purely illusory. Protection must depend upon the action of the sea-going navy which can directly cover the national ports in the only effective way without local assistance.

B.—The term "interior waters" is relative only. In the strategical sense, it might be held to include the Irish Channel, the Bay of Fundy, the mouth of the St. Lawrence for a hundred miles, and the thousand miles of sea which lie within the great Barrier Reefs of Queensland. The protection of such waters as these is, however, evidently the duty of the sea-going navy or of a special force operating freely,[1] and does not fall within the province of floating defence as above defined.

[1] It is, for example, conceivable, though most undesirable, that the waters of the Irish Channel might be guarded by a large force of torpedo-boats. Such a force, however, must necessarily be entirely in naval hands, freed from all responsibilities in respect to particular ports, and wholly apart from mere floating defence.

Interior waters in the present connection are those only which are entered by a defensible channel, or which permit free handling of the class of hostile vessel which could reasonably be expected to enter them, and which cannot be covered by artillery fire from the shore. Such waters are rare throughout the British Empire. It is commonly forgotten that every condition which gave importance to inland fighting during the American Civil War is wanting in our wide and scattered territories. The fringe of inland waters which stretches along nearly the whole eastern seaboard of the United States, the wide land-locked bays and the great rivers have not fallen to our share of the world.

At Mobile, Farragut's squadron, once entrance was effected, found free manœuvring waters. Beyond New Orleans lay the Mississippi, navigable by his whole squadron for nearly 300 miles. We have only one Mobile Bay—Port Phillip—and the defence of our only Mississippi —the St. Lawrence—must necessarily be from without and not from within. The lessons of the American war are rich and varied; but oblivion of the primary conditions of the combatants has caused them to be deplorably misapplied. Between our ports and an enemy's squadron lies the greatest navy in the world; but defective imagination causes its presence to be ignored, and Captain Mahan's reminder, carrying a force which an English writer cannot hope to wield, was unquestionably needed. The storm-beaten ships hundreds of miles from the shores of England, ships which the soldiers of the Grand Army never saw, and whose very existence was forgotten, effectually guarded our seaboard and shattered the designs of Napoleon. If the Northern and Southern States had possessed even equality of naval resources, fighting in inland waters would not have entered into their operations. These considerations are vital to the present question; for, so long as the command of the seas is retained, hostile vessels suitable for service in interior waters cannot be moved over large distances of sea; and, of special craft, only 2nd class torpedo-boats transported by large cruisers need be considered in relation to the majority of our ports.

Small harbours, such as Malta, Singapore, Mauritius, St. George's Bermuda, and ports lying far up difficult channels of approach, such as London and Glasgow, can be left out of account. Wherever an armament can be effectively employed on shore, it is idle to put it afloat, and any measure of protection which the sea-going navy cannot supply, can in all these cases be provided on shore. It may be urged that localised torpedo-boats might prove valuable at ports, such as Malta or Singapore, to attack the transports of a force seeking to land in the vicinity.[1] Such a contingency, assuming it to arise, would evidently be first recognised by the naval commander-in-chief, whose dispositions would be framed to meet it, and no special local provision seems either necessary or desirable. Similarly, in naval ports such as Portsmouth, Plymouth, or Chatham, floating defence, if ever required, is certain to be present. Special provision is superfluous. Finally, in all waters over which fire from the shore is intended to be employed, mobile floating defence is a pure encumberance.

[1] Just as torpedo-boats from Valparaiso might possibly have acted against the Congressionalist transports in Quinteros Bay.

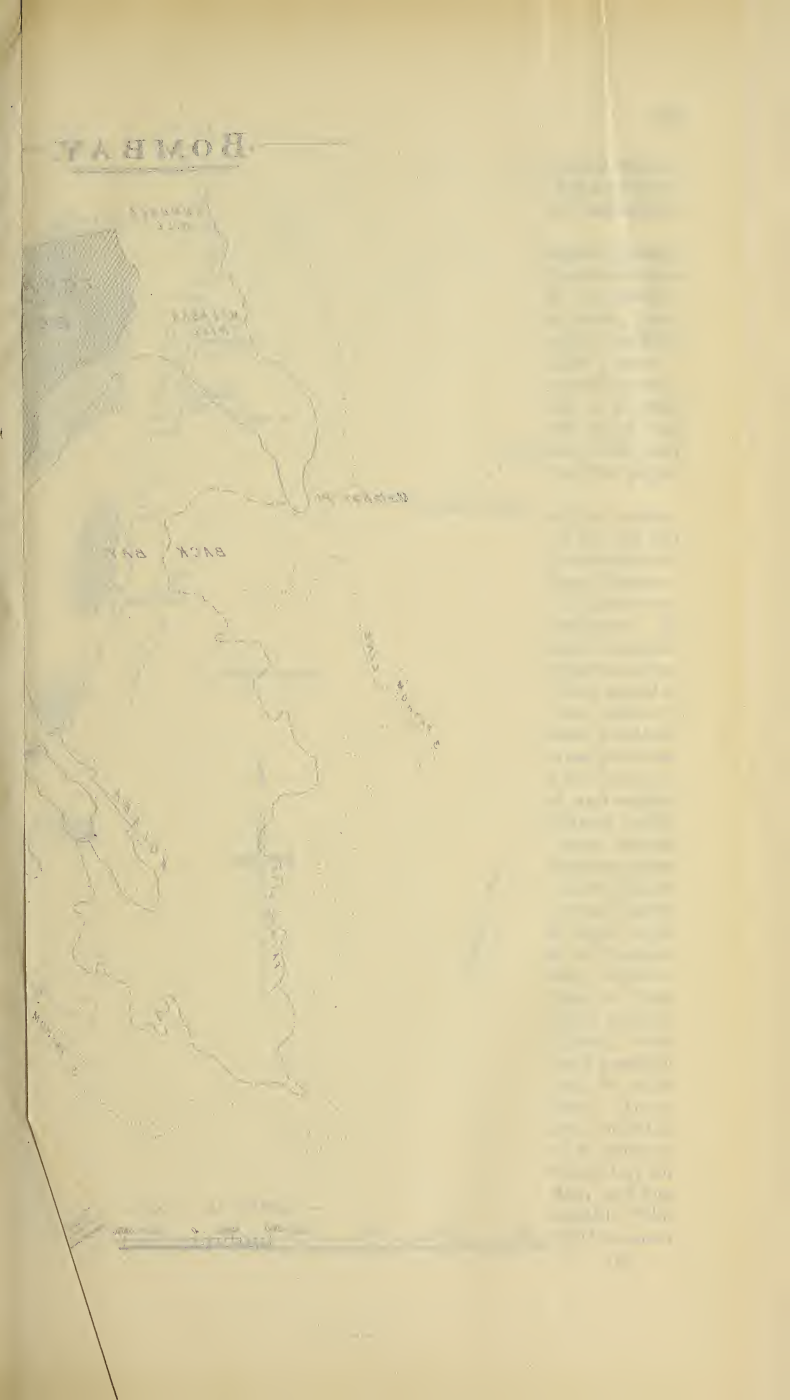


PLATE I.

BOMBAY.

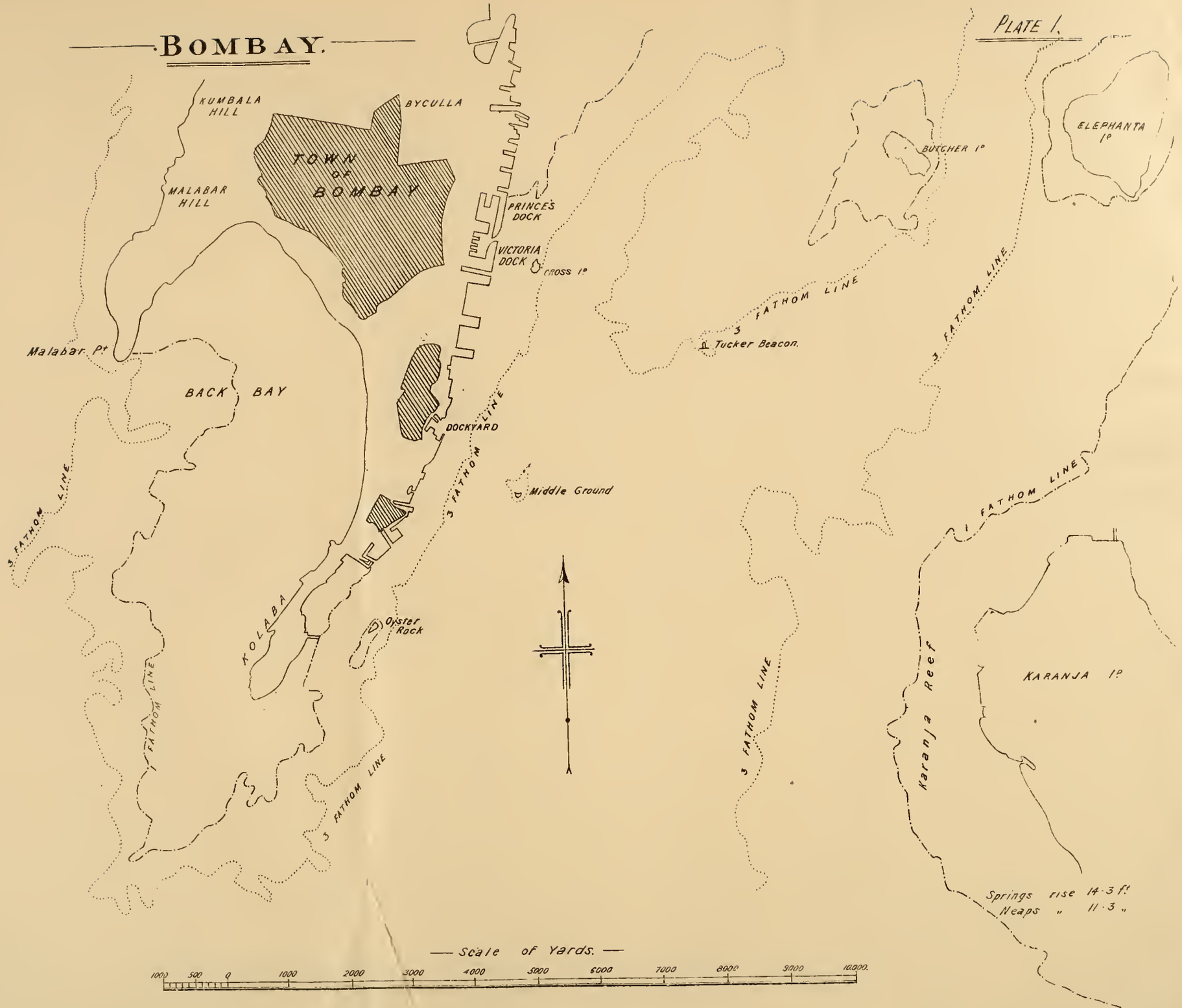
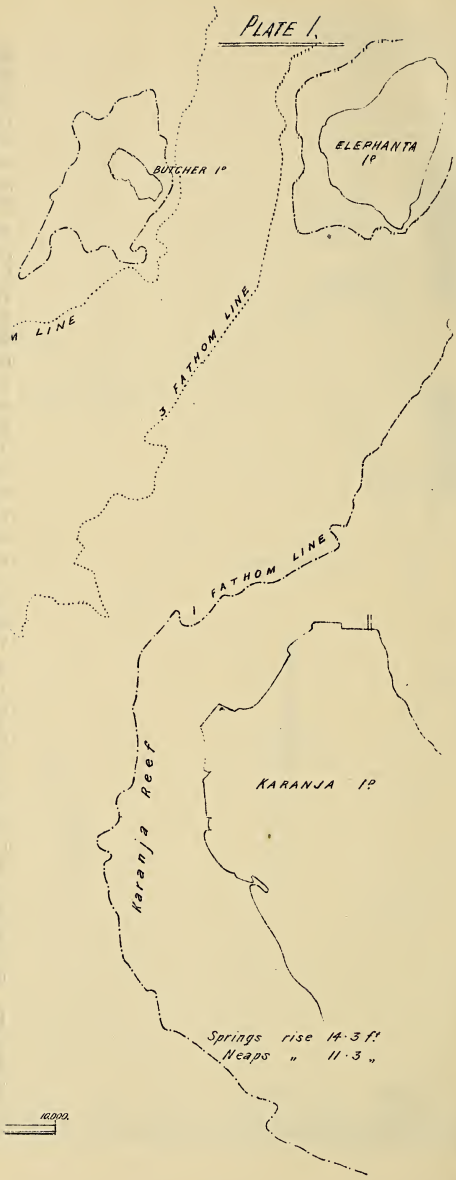


PLATE I.


ELEPHANTA Ip
BUTCHER Ip
3 FATHOM LINE
1 FATHOM LINE
KARANJA Ip
Springs rise 14·3 ft
Neaps " 11·3 "
16000

In ports containing vessels liable to torpedo-boat attack, small craft in motion must by night be fired at without question, and by day any interference with the free use of artillery fire would be an intolerable restriction to an arm of the first importance.

In every remaining case, the only questions are as to whether floating defence possesses any real advantage—sufficient to justify its provision—over the means of attack, and in what manner it can be usefully employed? A vague demand for light draught armour-clads, gun-boats, armed steamers, torpedo-boats or guard-boats, should invariably be resisted. Their several advocates must be forced to show a case.

Two ports, more or less typical, suggest themselves as possibly suitable for the employment of floating defence. At Bombay, it already exists in the form of the *Abyssinia* and *Magdala* turret ships, the *Assaye* and *Plassey* torpedo gun-boats of the *Sharpshooter* class, and some torpedo-boats. At Liverpool, it has not passed beyond the paper stage.

An attack with a view to hold or destroy Bombay could be undertaken only by an expeditionary force, when the command of the sea had been lost. The difficulties and risks of a naval raid in any strength are considerable, since the nearest refuge of a naval Power—Diego Suarez—is 2300 miles distant. The object of such a raid must be to destroy or remove shipping or to injure the town and docks by bombardment. To what extent will floating defence avert this danger, assuming it to exist? Examine the chart of Bombay (Plate I.) and endeavour to formulate some definite course of action for the *Abyssinia* and *Magdala*. Their speed is probably eight knots. If sent out to sea their seven to ten inches of armour would confer an advantage over an unarmoured cruiser, but their slow manœuvring speed would prove a heavy handicap. An early retreat would seem unavoidable. Once back within the waters of the harbour, where shall they be posted? If on the side of Oyster Rock and middle ground, they will merely become supplementary and relatively inefficient batteries. If at the edge of the Karanja Reef, then, almost inevitably, they will either interfere with the fire of the batteries when it is likely to be most effective, or throw their shell into the buildings and docks, or both. A better position would perhaps be near Tucker Beacon; but the drawback would only be postponed. If kept under weigh, they might perhaps find favourable opportunities to engage. If a hostile vessel took the ground at a point where the shore batteries could not reach her, they would probably be able to settle her fate. On the whole, the advantages of these vessels do not appear proportionate to their cost. So long as no coast batteries existed, their protection was necessarily valuable, and they, at least, imposed a certain minimum strength upon a raiding force. Now, they can do little that cannot be more effectually accomplished by fixed defences. Turning to the *Assaye* and *Plassey*, it is difficult to assign to them a suitable *rôle*. They each carry two 4·7-in. Q.F. guns; their speed is perhaps 19 knots. For destroying torpedo-boats they are well suited, but an enemy's cruisers could scarcely send in their boats by day, and the chasing of torpedo-boats by night in such waters would resemble "the hunting of the snark." To send out these gun-boats to engage the much

more powerful vessels which an enemy must employ would involve their fruitless sacrifice. If kept out of the way at first, they may find chances of employment, most probably in the case of a hostile ship already disabled. The situation of a hostile ship disabled at Bombay with no available port within 2300 miles will, however, be sufficiently precarious. Almost any employment of the *Assaye* and *Plassey* in war would apparently be more useful than to tether them to Bombay.

The local torpedo-boats would doubtless prevent an enemy's ships unprovided with nets from anchoring for the night in Bombay roads. Chances for their employment might possibly arise if, as is improbable, ships were committed to a serious engagement with the coast batteries.

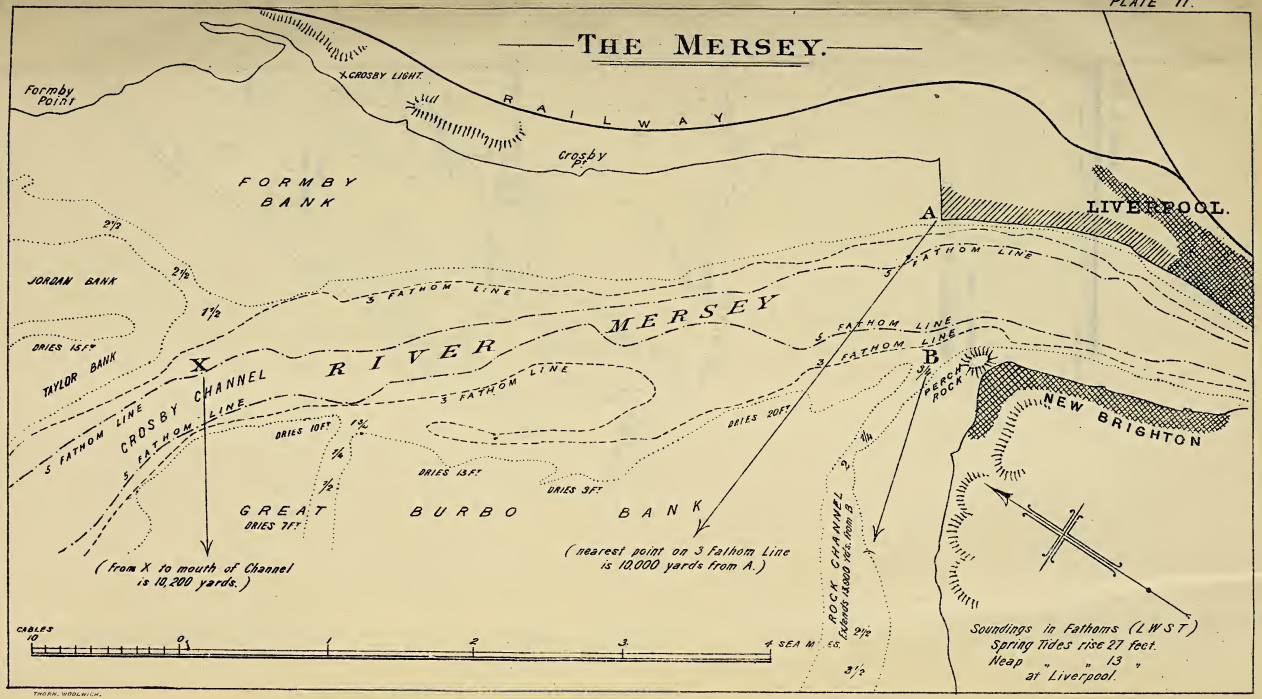
While, therefore, Bombay, undefended, would court injury from a flying raid of fast cruisers, even though the command of the sea was in our hands, existing fixed defences combine with geographical position to make such an attempt supremely improbable, and floating defences now appear to be a somewhat superfluous addition.

At Liverpool (*see* Plate II.) the conditions are different. A narrow and exceptionally difficult channel affords the only entrance for large ships. A maze of dangerous banks, extending to more than 10,000 yards from the most exposed docks, confer substantial protection. Bombardment by heavy ships is possible only by entering the channel and accepting an engagement with fixed defences in very cramped waters. Such a proceeding would evidently involve grave risks, and even if the geographical position of Liverpool Bay were more favourable to an enemy's enterprises, it does not fall within the limits of reasonable probability. A heavily armoured turret-ship moored at X. and protected against torpedo-boat attack would obviously be a formidable antagonist, viewed from the purely academical standpoint. But this is not the question, and the naval aspects of an attack upon Liverpool can be properly appreciated only by imagining the place to be situated at the mouth of the Gironde and the relative strength of the French and British navies to be reversed.

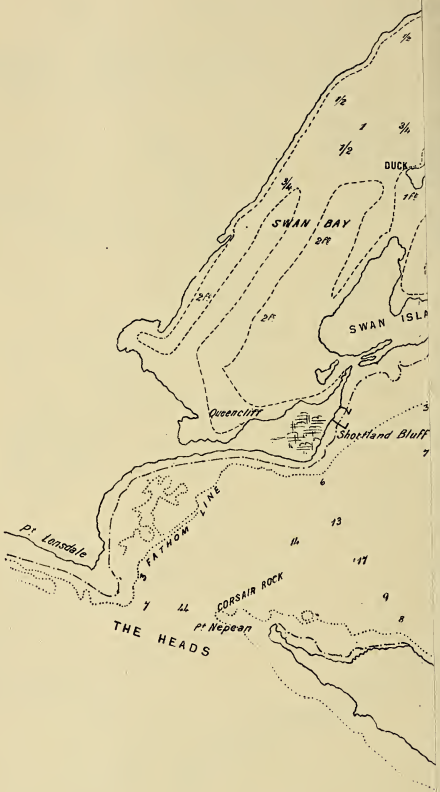
Again, the docks and shipping of Liverpool might be attacked by a light draught flotilla, manœuvring freely over the banks at high tide, and floating defences might be demanded to meet such an attack. The mouth of the Mersey lies, however, strategically within interior waters, and the conditions necessary for the employment of the requisite flotilla in such waters imply that Liverpool as a commercial port has already ceased to exist. Protection against this form of attack must evidently stand or fall with the general naval defence of the Empire.

The case of Port Phillip (Plate III.)—the British Mobile—differs considerably from those of Bombay and Liverpool. Once past the difficulties of the entrance, an enemy's squadron is in broad and open interior waters, giving ample manœuvring space and free access to Melbourne. Assuming the absence of all protection by artillery fire or mines, it would necessarily be the function of floating defence to engage an enemy while hampered by difficulties of navigation. Advantage would be sought in light draught and consequently greater freedom of movement. If the enemy succeeded in effecting a passage, the advantage would at once pass to him, since his force in

THE MERSEY.



THORN, WOOLWICH.



SOUNDINGS IN FATHOMS.

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SCALE OF Y

THORN, WOOLWICH

PLATE III.

PORT PHILLIP.

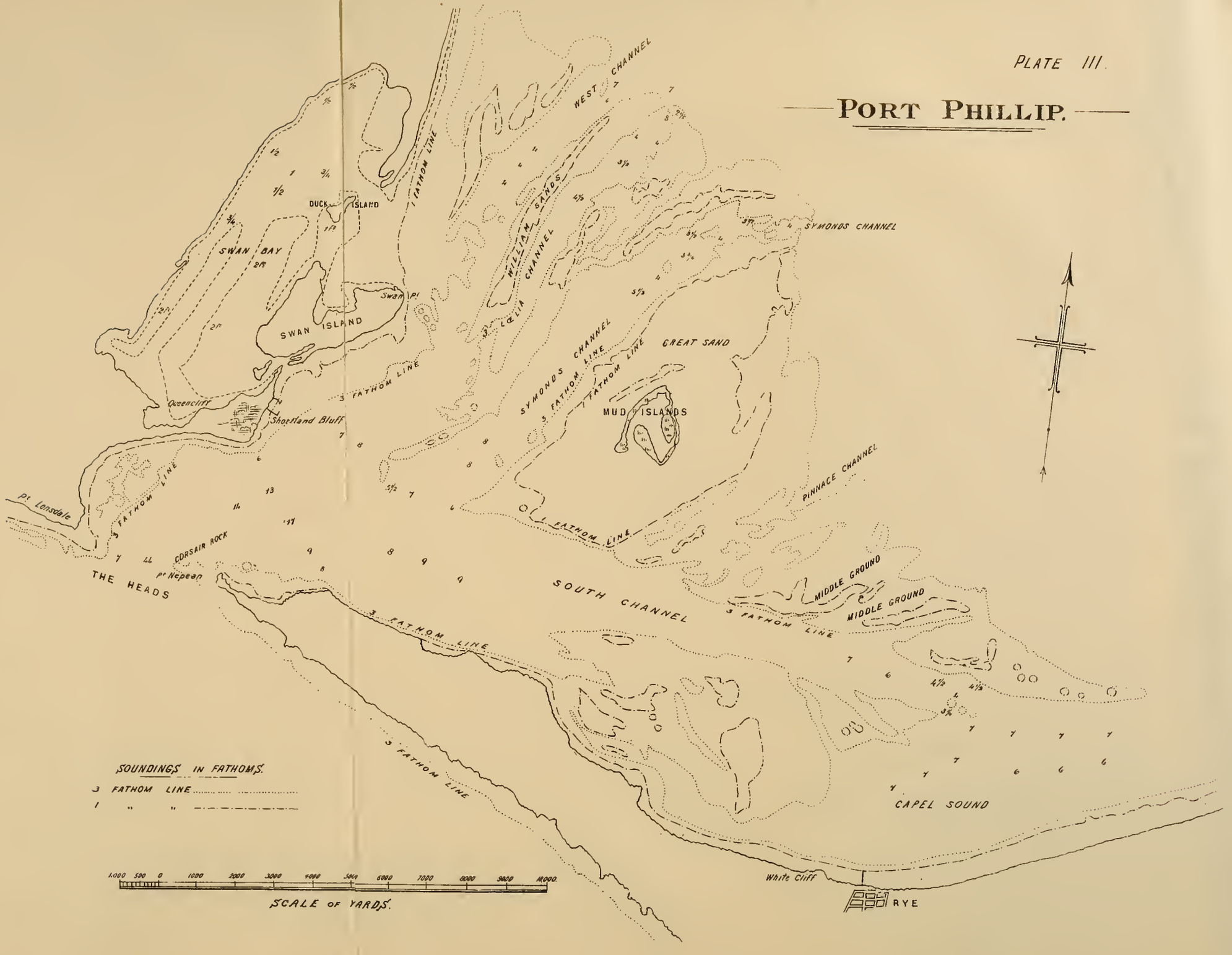


PLATE III

FORT GRIFFIN

open waters would necessarily be superior. Immensely powerful fixed defences having been provided, the *rôle* that falls to the local flotilla is that contemplated by Buchanan at Mobile—to remain behind the line of defence, endeavour to supplement the action of the batteries on shore, and complete the discomfiture of any vessel which had received from them rough handling. At Mobile this plan failed, for Farragut lost only one vessel, and this by misadventure, in making the passage, and his squadron having been little injured by the fire of the single obsolete Fort Morgan, easily overpowered the weak floating defences. The difficulties of navigation were, however, inconsiderable, and the only risk was that of an indifferent mine-field, which might have been avoided if Farragut's wishes had been carried out.

At Port Phillip there are available the *Cerberus*, turret-ship, with four 8-in. B.L. guns, 8 to 11-in. armour protection, and perhaps 9 knots speed; the *Victoria* and *Albert*, unarmoured gun-boats of 11 and 9 knots; four smaller gun-boats, armed hopper barges and torpedo-boats. Such a flotilla, taken in conjunction with the hydrographical conditions, is evidently formidable. If floating defence has any special value, this should suffice alone to protect the entrance of Port Phillip against any attack likely to be attempted from bases more than 4000 miles distant. To it is added, however, a strong mine-field and fixed defences mounting 30 or more guns disposed in two lines. Assuming the second line of defence—Swan Island, South Channel and Frankston forts—to be suppressed and the strength of the first line to be halved, floating defence might perhaps be justified. If the distance of Melbourne from the Heads were so short as to render it probable that *torpilleurs em barqués* would be sent in by night from cruisers outside, a catcher would be a reasonable provision.

Space fails to discuss the few other British ports in which floating defence appears capable of any justification. To them must be applied the following questions:—

(*a.*) What form of attack is reasonably probable?

(*b.*) What special protection does floating defence promise which fixed defences cannot better secure?

(*c.*) How can local craft be employed so as not to prove an encumbrance to the defence?

Only in cases where the two latter questions can be satisfactorily answered may the provision of floating defence be justified. Guard-boats, which have been the subject of the wildest theorising, are perhaps already defunct? Mines, in the very few British ports to which they are applicable, can be defended from the shore. In ports liable to torpedo-boat attack all suspicious craft must, at night, be fired upon without question, and moving guard-boats would become either mere targets to their friends on shore or dangerous impediments to fire at a critical moment. A preposterous proposal to establish torpedo-boats manned by local crews appears at intervals in the press and finds supporters. To the first question—What are those boats to do? No satisfactory answer is forthcoming. We must, apparently, fall back

upon "moral effect"—another Mesopotamia. No service is less suited to a partially trained *personnel* than that of the torpedo-boat. The cost of maintaining boats with their necessary number of skilled specialists, in scattered ports, is usually left out of account. In ports which embrace within their defences free manœuvring waters not protected by artillery fire and capable of being easily entered at night by hostile vessels, the provision of local torpedo-boats may be justified. They must, however, possess trained crews, and, except when used outside of the range of the fire of the defence, they will be a distinct encumbrance.

In every case where fixed and floating defences are intended to co-operate, grave practical difficulties will arise. The command of a port must be vested in a single head—a military officer, except, perhaps, at naval bases. To ensure harmony of action and prevent interference between two such incongruous forces as fixed and floating defences is, a task from which the most self-confident may well shrink. Unless local craft can be independently employed outside the range of the shore batteries, they will inevitably enfeeble the defence. For purposes of communication, and in some cases to provide fixed electric-light beams on certain waters, they will prove useful.

If, quitting generalities, we seek to investigate the practical modes of employing floating defence in specific cases, the advantages will usually either diminish or disappear. If, forgetting the requirements, real or assumed of other nations, we endeavour to realise our own, floating defences will no longer be the subject of vague demands. Where really necessary protection cannot otherwise be obtained, they will be employed; but they will no longer be superimposed—in fact or on paper—upon defences already inordinate. If the sea power of Great Britain is ever challenged, then every ship and every sailor employed upon the seas will be a gain to the national strength, and every diversion of ships or men to local defence will be a distinct loss. It is on the seas alone that the Empire can be defended. On the seas lies the real security of its ports.

AN EPISODE IN THE LIFE OF MAJOR-GENERAL G. H. VESEY, R.A.

BY

COLONEL T. B. TYLER, R.A.[1]

About March 1851 Captain Vesey sailed from England in command of a draft for the artillery at St. Helena in the brig "Levenside." Early in the voyage disputes arose between him—the least quarrelsome of men, though one of great firmness of character—and the master, Capt. Campbell, a man of arrogant temper; and the antagonism grew sharper as the voyage proceeded. On the 15th May, the weather being perfectly fine and the glass steady, the master ordered the booby-hatch to be closed, declaring that bad weather was to be expected; Captain Vesey, fully aware that the order was issued only to show the master's authority over him, objected that it was arbitrary and unnecessary, and calculated to injure the health of the troops (it was very hot), and ordered his men to remove the hatch; this was done, and no change in the weather was experienced. On the 17th there occurred a quarrel between one of the men and the ship's carpenter, which is described in the quotation from *The Times*, and fairly correctly, but with this notable omission, that during the struggle for the gun, Capt. Vesey, seeing the master was losing his head altogether, laid hold of the full-cocked pistol which the latter kept pointed at him; as he did so Captain Campbell pulled the trigger, and Captain Vesey would have been shot had he not kept his thumb on the percussion cap. Ten years afterwards he showed me the scar on his thumb caused by the blow of the falling hammer. It will be observed that Captain Vesey was supported in his action by Captain Neill, A.-D.-C. to Sir Emerson Tennent, as he was by another artillery officer who was on board, but whose name I forget. The rest of the story is told in the extracts from *The Times*; the case was tried and the verdict, for technical reasons, went against Captain Vesey. But the Duke of Wellington, then Commander-in-Chief, was so fully satisfied that Captain Vesey had acted rightly in the interests of the troops under his command, that he not only prevailed on the War Office to pay the damages laid, but also caused Captain Vesey to be asked if he was desirous of Staff employ. To this very complimentary enquiry he returned the characteristic reply that he wanted nothing.

[1] The circumstances connected with the story told here by Colonel Tyler are so strange and so few details are forthcoming that the Committee will be obliged to anyone who can and will throw additional light on the matter.

Thinking so interesting a regimental record should not be lost, I have, since General Vesey's death, sought in various directions for more information regarding the eventful voyage, but without success. Major Murdoch writes:—"There is not one scrap in the R.A. official records of the St. Helena 1851 episode; nor can I find anything in the Institution and Garrison libraries here." So that for the slight additions I can supply to the story as related in the extracts, I am indebted to my memory of the history of the voyage related to me by Captain Vesey more than 30 years ago. He seldom mentioned the incident; not a great talker, he was ever one who considered himself and his doings as uninteresting subjects for general conversation; one of the noble silent men, "scattered here and there, each in his department; silently thinking, silently working . . . They are the salt of the earth."

So far as I can remember he only referred to the matter of his own accord once in my hearing: we were breakfasting in the Mess at Shorncliffe in the year 1860; suddenly he sprang up and hastened to the window to look at a man who was passing; on returning to his seat he said to me: "I declare, I thought it was the captain of the 'Levenside.' He swore he would do for me some day, and would find me wherever I was." He seemed to regard the possibility of the encounter with amusement rather than alarm; it, however, never came off.

With reference to the passage in the extract from *The Times*, "the vessel was navigated by the mates, by direction of Captain Vesey," he told me that most of the crew and all the officers, except one, sided with the master and refused to render any assistance in navigating the ship, and that the only officer who would help him was one of the juniors—my impression is *the* junior; in the extract from *The Times* of 13th September, the first mate is mentioned as the one who separated himself from the ship's officers. However this may be, the officer and Captain Vesey (who knew something about navigation as he did about many things), with the help of some of the crew and of the gunners, took the ship into St. Helena. This was not the least notable incident during a very remarkable and sustained display of courage in the assumption of heavy responsibility under circumstances to which it would be difficult to find a parallel.

A MERCHANT VESSEL SEIZED BY THE PASSENGERS.

The *Advocate*, or *St. Helena Weekly News*, a paper recently started in St. Helena, gives an account of some extraordinary occurrences said to have taken place on board a vessel called the "Levenside," and which were being investigated by the authorities of the island.

The vessel had on board Captain Vesey, of the Royal Artillery, in command of a detachment of his corps, and Captain Neill, *aide-de-camp* to the expected Governor, Sir Emerson Tennent. She arrived on the 29th of May, and it appeared that on the 15th of that month, while at sea, Captain Campbell, the master, ordered the booby-hatch to be closed. This was done, and immediately afterwards Captain Vesey summoned the troops under his charge to take off the hatch, in defiance of the master's orders, which was immediately carried into effect. On the 17th, two days after this, a squabble appears to have taken place between one of the soldiers

and the ship's carpenter. Captain Vesey insisted that the carpenter should be punished, but Captain Campbell, the master of the vessel, would not punish the man. This led to some sharp words between the officers, and it is asserted that Captain Vesey said he had a superior force on board and should not hesitate to use it when he thought requisite. This language appears to have excited Captain Campbell. At half-past eight o'clock at night the captain ordered the booby-hatch to be put on; but no sooner was the order given than Captain Vesey, in charge of the troops, said it should not be done. Captain Campbell then pulled out a pistol and told Captain Vesey that if he attempted to interfere with him and prevent any of his crew obeying his orders, he would shoot him through the heart. Upon this qualified threat being uttered, Captain Vesey immediatelly called his men to fall in round the hatchway and ordered the bombardier to go below for arms. This order was instantly obeyed; and as soon as Captain Campbell saw the arms being handed up the hatchway he went forward, seized hold of one of the muskets, and commanded the soldier to give it up, saying—"Put that down, it does not belong to you, it belongs to the ship." The soldier refused, whereupon a struggle took place for the gun, when someone called out, "Seize him," on which several soldiers seized the captain, threw him against a boat, and wrenched the pistol out of his hand, as well as the musket he attempted to take from the soldier. Captain Vesey then ordered his hands to be lashed behind his back, and, it appears, at the instigation of Captain Neill, he was hurried to the hold and secured to a stancheon. The next morning he was unlashed from the stancheon and had strong chains fastened to his wrists by padlocks. In this position he was kept in the hold twelve days and nights, with an armed sentinel keeping watch over him. He was not allowed to communicate with the crew during this time, nor was he released from his captivity, even on the arrival of the vessel in the roads, till the police went on board and caused him to be unchained. Immediately Captain Campbell was seized and forced into the hold, Captain Vesey commanded one of the soldiers to turn everyone belonging to the crew out of the cabin and take possession of it, which was done. He then seized the ship's papers, and the vessel was navigated by the mates, by direction of Captain Vesey, and on its arrival at St. Helena, on the 26th, he went on shore and obtained a warrant against the master on the charge of assault and attempted murder. Captain Vesey's alleged reason for not allowing the booby-hatch to be closed is, that the weather was hot, and that it would endanger the health of the men, about thirteen in number.

After four days' investigation, Captain Campbell was committed for trial on the charge of assault with intent to murder. Information was then laid by Captain Campbell against Captain Vesey and the others of his passengers for piracy and illegal seizure of his ship, which information was taken and signed by the magistrates.—*The Times*, August 2nd, 1851, p. 5, column 6.

"The 'Levenside.'

The case of this vessel, seized by Captain Vesey, of the Royal Artillery, has concluded. It will be recollected that while on the passage to St. Helena, Capt. Vesey attempted to uncover a hatchway which, being closed, was thought likely to be injurious to the health of the men under his command. The captain resisted by force, and Captain Vesey then caused him to be confined till the termination of the voyage. The *St. Helena Advocate*, of the 10th July, says: 'The Sessions commenced this morning. In the above important case, we have just time before going to press to report that the indictment against Capt. Campbell, the master of the vessel, for assault with intent to murder, has been thrown out by the Grand Jury, and that the indictment for piracy against the passengers and first mate has also been ignored.'"—September 5th, 1851, page 6, column 5.

THE SEIZURE OF THE "LEVENSIDE" BY MILITARY OFFICERS.

[To the Editor of *The Times*].

"London Street, City,
SIR, September 12th.

From letters received last evening by the owner of this ship, it appears Capt. Campbell has obtained a verdict against Captain Vesey, with £200 damages.

I am, Sir,

Your obedient Servant,

JOHN MACLEOD."

From *The Times*, September 13th, 1851, page 5, column 6.

SADDLERY, AND THE CAUSES, PREVENTION, AND TREATMENT OF SORE BACKS.

BY

VETERINARY LIEUT.-COLONEL W. B. WALTERS, C.B., F.R.C.V.S., *late* A.V.D.

(A Lecture delivered at the Royal Artillery Institution, Woolwich, 15th February, 1894).

COLONEL W. S. CURZON, R.A., IN THE CHAIR.

THE CHAIRMAN—I will ask Colonel Walters to commence the subject of his lecture.

VETERINARY LIEUT.-COLONEL W. B. WALTERS—As the subjects of saddles and sore backs are so intimately related to each other, I propose to consider them conjointly, for the sake of brevity and convenience; and, in doing so, I shall occasionally quote from a paper on the "Casualties Amongst Army Horses in the Field," read by me at the Royal United Service Institution in February, 1890.

With our present knowledge of the art of saddle-fitting and the care exercised by all ranks of our mounted corps in barracks, camps, and on the line of march, sore backs on home service are much less numerous than they used to be in former years; and although, in spite of every precaution, they do occasionally occur, they are generally detected before they have assumed anything like formidable proportions and are easily and speedily cured. But on a campaign, where each serious case means the temporary loss of a mounted soldier, the matter assumes a very serious aspect. On active service in the field the casualties resulting from saddlery and harness galls are, perhaps, the most important of any with which we have to deal; not only on account of their extreme frequency, but also because the majority of the cases which occur on service can, and ought to be prevented. When we consider the vast number of horses which were rendered temporarily useless from injuries of this description during the brief military operations in Egypt, and think of what the consequences might have been had the campaign been indefinitely prolonged, it must be admitted that the subject of sore backs demands the earnest and immediate attention of those who are responsible for the efficiency of an army in the field. All military officers are aware that the exigencies of war service sometimes demand extraordinary exertions on the part of mounted troops, and that there are occasions when it is absolutely

necessary that every available horse should be in the ranks. A sore back is no excuse. It is in instances of this sort that practical experience and a thorough knowledge of the art of saddle-fitting are of inestimable value. By the exercise of a little mechanical ingenuity many horses with galled backs have been enabled to carry their riders on an emergency without undue suffering to the animals, or adding to the severity of the injuries. During the latter period of the Zulu war, that is from the arrival of the reinforcements after Isandlhwana in 1879, no less than 253 English and 488 Colonial horses were admitted to hospital for saddlery and harness galls—all serious cases. The English horses carried the ordinary stuffed pannel-saddle and numnah, until it was proved beyond doubt that the latter was a totally insufficient protection, when the thick folded blanket was substituted, with the best possible results. In the Colonial corps blankets were not carried, owing to the supposition that their value would be insufficient to compensate for the extra weight imposed. The saddlery issued to these troops was purchased in the Colony, and proved to be ill-fitting and of inferior quality. The saddles constantly required repairing, but the paucity of saddlers and want of material rendered this at all times a difficult matter, and frequently it was impossible to keep them in a serviceable condition. Hence the number and severity of sore backs amongst the irregular cavalry in Zululand. During the short Egyptian campaign of 1882 no less than 876 cases of saddlery, harness, and rope galls occurred amongst the 5080 horses employed. Referring to the severity of the cases of sore backs amongst the horses of our cavalry in Egypt, the Veterinary Officer attached to the 7th Dragoon Guards writes:—"The sore backs and fistulous withers were the worst I have ever seen, and several horses were destroyed from these causes, as it was impossible to cure them. Some of the cases began early in the campaign, but it was impossible to treat them effectually, as the horses could not be relieved from duty." It will be remarked that although this campaign was of shorter duration than the Zulu war, the number of sore backs amongst the English horses in Egypt was considerably greater in proportion. The majority occurred amongst the cavalry, and many cases were caused by the surcingles, which were used in the lines to keep the numnahs in their places in order to protect the horses' backs from the effects of the sun. For this purpose it was necessary to buckle them somewhat tightly, and, as they were without pads, the pressure upon the spines, especially of those horses which were low in condition, produced abrasions and sores of greater or less severity. Very many other cases were doubtless caused by direct saddle pressure, as the folded blanket was not used under the saddle during the operations. To give one more instance of the prevalence of sore backs on service, amongst the comparatively few cavalry horses employed with the Suakin Expeditionary Force, 68 cases occurred in the 5th Lancers and 23 in the 20th Hussars during the month of April, 1885. In my official report on the campaign I find the following remarks on this subject:—"I consider that very many of these sore backs might have been prevented had the folded blanket been used instead of the numnah, which was not sufficient to prevent saddle

pressure in those instances where muscular wasting occurred from loss of condition."

With these facts before us we will now proceed to the general consideration of saddlery and harness galls. The principal causes of sore backs are:—(1) The faulty position of the saddle; (2) the defective condition of the saddlery; (3) the accidental presence of foreign matters under the numnah; (4) careless saddling; (5) careless riding; (6) the weight and distribution of the accoutrements.

As you are aware, the question of military saddles has occupied the attention of the authorities for many years, and during this period several patterns have been devised, and subjected to trial. Whether the acme of perfection has been, or is about to be arrived at, or whether the latest pattern might be improved upon, are points scarcely within the scope of this lecture. We have merely to deal with the saddle as it is, and to inquire into the conditions which render it a source of injury to horses' backs, and to suggest the adoption of such preventive measures as are best calculated to meet each particular case. There can, however, be no doubt that the abolition of stuffed pannels and the introduction of the present pattern saddle are very important steps in the right direction; but I certainly am of opinion that the small thin blanket is not sufficient to meet the requirements of active service, even with the additional protection of the numnah. If the numnah is considered to be indispensable as a means of affording a smoother surface to the horse's back, and to prevent the possible slipping or wrinkling of the blanket (which I doubt) there can be no reason to object to it; but if it is retained I should very much like to see its thickness reduced, and the size and weight of the blanket increased. It must be remembered that a saddle which fits a horse in "barrack-yard condition" soon ceases to do so on active service in the field, for the simple reason that hard work, exposure, short rations, etc., cause loss of flesh, and this muscle wasting materially alters the conformation of the back; consequently the saddle becomes a misfit, and a sore back is the probable result. Whether the new pattern arrangement will be found sufficient to meet such a case I do not know, as it has not yet, I believe, been tried under the conditions experienced on service, but I do know that a good stout blanket, properly folded, will not only protect the parts liable to injury from pressure, but will frequently enable us to keep a horse at duty in the ranks which would otherwise be on the sick list. Writing on this subject as far back as 1814, General George Hanger says:—"In the British Legion Cavalry in America we had no sore backs, for a blanket six or eight times doubled was always laid on the horse's back under the saddle." The following objections to the use of the blanket have been advanced:—(1) The trouble and difficulty in folding it in the dark; (2) its tendency to slip from under the saddle; (3) careless and uneven folding, causing sore backs; (4) the extra weight; (5) its liability to become saturated with wet, and covered with mud. Experience has proved that the first three objections are absolutely untenable. If a blanket is properly folded it will retain its place under the saddle, and soldiers can be taught in a few lessons to do this with ease, rapidity, and without wrinkling it, even in the dark. I consider that the slightly

additional weight, of a stout blanket, is more than compensated for by its many advantages. As regards the fifth objection, that is the liability to become saturated with wet, the present Director-General of the Army Veterinary Department, writing on the subject of sore backs in South Africa, says :—"Another objection, and, I think, the only one that requires seriously to be met, is that the blanket, when on the horse during the night, may be rolled on if he is down, and that it may, if the weather be wet, thus be saturated or partly covered with mud. . . . This looks a formidable business, but it is only so in appearance. Even if the blanket does get wet and muddy it is easily dried again." Referring to the many advantages of the blanket this officer continues :—"We found, in the 17th Lancers during the Zulu campaign, the following to be the advantages of the blanket. It furnished a much-wanted warm covering for the horse at night. Horses often fall away in condition very rapidly at first during a campaign, so much so that the saddles which fit them well in barracks will become much too large, and consequently a prolific source of sore backs. A numnah has very little effect in compensating for this reduction of condition ; but the blanket I recommend can be doubled as often as necessary, and so the saddle by this means can be made to fit. . . . . The men of the 17th Lancers were constantly obliged to fold their blankets, and saddle in the dark ; but I do not remember our attributing any sore 'backs' to wrinkling or bad folding. . . . . If the nights are cold, I consider a good large blanket equivalent to an extra feed of oats per diem in saving expenditure of animal heat, and, in addition, there is the gain in comfort to the horse. . . . . I recall to mind many instances where, a sore back having occurred with a numnah, a blanket was ordered, and the injury gradually got well without the horse's work being stopped."

The above remarks are the outcome of actual personal experience in the field, and go far to substantiate what has been already said with reference to the superiority of the blanket for active service. Not only can the blanket be folded in various ways to suit nearly all conditions of backs and saddles, but by varying its thickness at different points a gall can be so protected from saddle pressure that the horse, which would otherwise be non-effective, can be ridden with impunity. The only real objection that I see to the use of the blanket is the one I have already alluded to, that is in the case of a horse rolling in it in wet and muddy ground. Being saturated it would have to be folded and placed upon the animal's back in this condition, and its weight would be necessarily increased. However, I do not consider this objection to be one of very serious moment, and it must be remembered that any other arrangement of saddlery equipment would suffer in the same way under similar conditions.

Sore backs may be divided into injuries to the withers and injuries to the back proper. Injuries to the withers occur from the front arch of the saddle or the edge of the felt numnah pressing upon the part, and are caused either by the arch being unduly wide and allowing the saddle to rest on the top of the withers, or by its being too narrow and pinching the sides. In either case it is obvious that the saddle

does not fit, and should be changed ; but if this is impossible, the evil may be remedied by the use of a blanket, folded the requisite thickness, and in such a manner as to relieve the parts from pressure. Injuries to the back proper may be caused by irritation produced by badly-stuffed pannels (old pattern) damaged numnahs, ill-fitting side-bars, careless riding, pressure from the valise kit, long and continuous saddle pressure, removing the saddle too soon after the man has dismounted, and from such accidental causes as breakage of the tree or leatherwork. The remedies to a certain extent suggest themselves, but there are several important points worthy of notice. With the old pattern pannel saddles we had considerable difficulty. The system used to be, as most of you are aware, re-stuffing the saddles when we could possibly manage to do it. When this could not be done other devices were used, such as applying an extra numnah, pricking up the stuffing, or chambering the saddle. The latter method is of very little use, because the saddle does not always stay in the place where it is first put, and the edge of the chamber will probably not only aggravate the existing sore, but may produce a new one. Injuries from badly-fitting side-bars occur principally from two causes. A straight-backed horse requires straight side-bars, and if these are unduly curved the pressure will be directed to one point—the centre—and the saddle will have a tendency to rock. If, on the other hand, straight side-bars are fitted to a hollow-backed horse, undue pressure will be caused by the front points and rear fans, and the saddle will oscillate. In neither case can an even bearing be obtained, and a galled back will probably be the result. A change of saddle is the only proper remedy, but if this be not possible the folded blanket may be used with advantage. Shifting of the saddle is nearly always in a forward direction, and may arise from either of the above causes, or from defective conformation, such as a shallow chest, low forehand, high loins, and excessively arched ribs. It is a difficult matter to keep the regulation saddle in its place on a very short-backed horse, because the rear fans project so far back upon the loins that the saddle is pushed forward by the action of the muscles, and the front points of the side-bars will interfere with the free play of the shoulder-blades. With the old pattern tree the remedy used to be to cut off the points of the side-bars, front and rear, and to screw on curved iron plates. This is not required with the new pattern tree, as I shall proceed to show you. This (*exhibiting the same*) is a pattern which has been very kindly sent up by Major Horton, the Inspector of Saddlery at the Dockyard. It is the newest pattern although it has been in use for some time ; but you will see that the front points of the saddle are curved and are much shorter than those of the old stuffed pannel saddle, and the same may be said of the rear fans. With the new pattern numnah pannels (*exhibiting the same*) a misfit can be remedied to a certain extent by placing one or more thicknesses of felt between the pannels and the side-bars in such positions as to enable the saddle to take the required bearing.

As Major Horton, the Inspector of Saddlery, is present I have no doubt that he will be good enough to explain the various details of the new saddle more fully after the lecture.

Referring again to the new regulation blanket you will observe (*exhibiting the same*) that although its size admits of extra folding, to a certain extent it is altogether unsuitable for use as a covering for the horse. It is evidently not intended for that purpose, but merely meant to keep the saddle from injuring the horse's back. I should like to see the size and substance of the blanket increased so that it could be used for both purposes, and am convinced that its enhanced usefulness would more than compensate for the slightly additional weight imposed.

Moreover, the numnah could be dispensed with, which, in my opinion, would be an advantage, and providing the felt side-bar pannels were always used, and the blanket properly folded, it could not work from under the saddle. Without the felt pannels it may have a tendency to slip, but the union of the two woollen materials prevents this.

The Mounted Infantry at Aldershot, under the command of Colonel (then Major) Hutton were, in 1887, provided with stout blankets, carried under the saddle, and the system answered admirably. Whether or not it has been continued up to the present day I do not know, but during the period the corps was under my observation I never heard of any trouble connected with the blanket, nor of a case of sore back having occurred, although the horses were, perhaps, worked harder than those of any other corps in camp.

I have here a sketch of the Mounted Infantry equipment, as devised by Colonel Hutton, which I will pass round for your inspection, as I shall have occasion to refer to it again presently.

The weight and description of the accoutrements are points which I approach with a certain degree of diffidence, because I am aware that the subject of saddle equipment has been thoroughly and exhaustively considered from time to time by experienced officers, and has lately been settled on the lines laid down by the Saddlery Committee. I venture to submit, however, that the weight imposed upon the troop horse, in marching order, by the miscellaneous articles comprising the soldier's kit is a powerful factor in the production of sore backs, and that if all superfluous weight could be otherwise carried—say, in light troop carts—the number of non-effective horses on service would be considerably reduced. I referred to this subject in the lecture which I gave at the Royal United Service Institution, in February, 1890, and during the discussion the system was objected to by a distinguished cavalry officer for the reason that when cavalry are detached and have to go over country in which there are no roads the carts could not keep up with the horses, and that the kit would not be available under all circumstances. I venture to submit, however, that a body of cavalry temporarily detached from the main force for any special purpose would probably go as light as possible, and the heavier portions of the kit would not be required, but I venture to submit that properly constructed troop carts ought to be able to keep up with cavalry or guns under ordinary circumstances, and if by this means the horses could be relieved of a considerable portion of the weight at present carried by the mounted trooper it would be an immense advantage to the animals, and would, I believe, tend materially to the increase of effi-

ciency. I merely repeat this suggestion because I think it is one well worthy of consideration.

You will observe in Colonel Hutton's equipment that the principle weight is carried in the pack-saddle bags, which hang below and in a line with the centre of gravity, consequently the forehand and loins are relieved of the mass of dead weight at present carried by the cavalry trooper. As Colonel Hutton remarks in his paper on "Mounted Infantry," "Fatigue is saved to the soldier and the minimum of inconvenience is caused to the horse." The saddle is of the American (Whitman) pattern, and the kit is carried in the detachable saddle-bags which rest behind the soldier's thigh. Whether such equipment would answer for the close knee to knee formation of our cavalry I am not prepared to say, it does not come within the scope of my paper; but at the same time I think that such an arrangement for carrying the kit is an admirable one, and might be considered.

Girth galls are caused by the saddle shifting forwards, by the girths becoming stiff and hard from perspiration, and by careless saddling. The remedy is to change or re-fit the saddle, and, if possible, to use a soft split, or raw-hide girth. Crupper galls are caused by an unduly tight crupper. This article of saddle furniture is at all times a useless encumbrance, and has, very properly I think, been more or less discontinued in our cavalry. I am aware that many officers are still in favour of the crupper, but for what reasons I am at a loss to understand. If a horse is so badly fitted as to cause a crupper to be necessary, every time the saddle works forward the crupper will become unduly tight, and in this condition it is very likely to cause a more or less severe gall.

The same remarks will apply to the breast-plate. If a strain is put upon this article by the working back of the saddle, the free action of the horse's forehand is impeded unless a breakage occurs. Carbine-bucket and sword galls are frequently met with on service, but these injuries are never, as a rule, severe, and can be remedied by slightly altering the position of the weapons. Surcingle galls are often very numerous, and sometimes severe. The cause has already been alluded to in my remarks on the cases of sore back in Egypt. A very simple and effective remedy is to place a pad of straw, hay, or grass on each side of the spine, under the surcingle, if the ordinary stuffed pads are not available. A surcingle should never be knotted to reduce its length, because the knot very often causes a severe gall. Collar and harness galls are neither so frequent nor so severe as those caused by the saddle, and do not require special mention. If a collar becomes too large, as the result of a horse falling off in condition, the best remedy is to pad it with strips of numnah felt. The same method can be adopted to save a gall from pressure. Chambering the collar for this purpose should be avoided, as it is practically useless.

I will now proceed to describe the different kinds of saddlery galls and injuries generally met with, and offer some simple suggestions for their treatment.

A very simple gall caused by saddle pressure sometimes occurs on one or both sides of the withers which scarcely amounts to a contusion,

but which is sufficient to produce a certain amount of irritation. Exudation of the watery parts of the blood takes place, resulting in a matted condition of the hair. This is a very simple case, and can be easily remedied; all that is required is to leave off the saddle for a few days, or to fold the blanket with an extra turn so as to prevent pressure to the part; sponge the gall with tepid water and afterwards apply a little carbolised oil or vaseline.

A very common form of injury is that of a fluctuating swelling on one or both sides of the withers, or in any other position liable to saddle pressure, arising from the same cause as the more simple gall just described, and resulting in the formation of a small sac of fluid underneath the skin. In very slight cases fomentations by means of a woollen cloth folded, wrung out of hot water, and placed over the part should be applied, or a folded linen cloth saturated with a lotion composed of one drachm of the sulphate of zinc to a pint of water may be secured over the injury, and kept wet for two or three days, afterwards a little stimulating liniment, such as "Elliman's Embrocation," may be used, with slight friction. If, however, the case is of a more severe nature, and the sac is of considerable size it should be freely slit open at the most depending part, and then treated as a common wound. The orifice must not be allowed to close quickly, or the sac will refill. Gentle pressure should be applied, with wet lint or carbolized oil dressings, and the wound will speedily granulate and heal.

On active service in the field, when it is absolutely necessary for every horse that can be ridden to be in the ranks, a heavy blanket can be so folded as to generally protect such an injury from pressure unless it is very severe. It used to be the practice in some regiments, and may be now for aught I know to the contrary, if a horse was discovered to have a sore back on the line of march, to punish the rider by making him walk the rest of the journey. I cannot help thinking that this is a very great mistake, as it tends to make men endeavour to hide a gall instead of reporting it at once, and by this means a very trivial injury may degenerate into a serious case.

Girth galls and skin abrasions can be treated very simply by merely cleansing them, and bathing them with salt and water, afterwards applying a little vaseline. Of course, the cause must be ascertained and steps taken to avoid a recurrence. The saddle should be carefully refitted, and a raw-hide girth may—when practicable—be used with advantage.

A "sitfast" is the result of an improperly treated or neglected saddle gall, and consist of a piece of dead skin lying embedded upon the sore. There is only one method of treatment for this: that is to dissect it out; it is not a difficult matter, and can be readily performed by lifting the edge of the skin with a forceps and cutting it out with a sharp knife. Then treat as a common wound with wet lint, or carbolised oil. In these cases, if the dissection is of a considerable extent, the granulations or new growth may become too "luxuriant" and assume the character of what is generally known as "proud flesh." This may require cauterising with nitrate of silver or a little powdered sulphate of copper, and the granulations will soon be reduced, while the stimulus from the caustic will increase the healing process.

Abscesses of the withers seldom occur on home service, owing to the precautions taken, but on a campaign they have hitherto been unpleasantly frequent. These cases occur from deep-seated injury caused generally by long continued saddle pressure, and are often difficult to treat owing to the dense nature of the tissues which lie beneath the skin, and then a liability to degenerate into fistulæ. An abscess generally assumes the form at first of a hard swelling, which is extremely painful to the touch. Our object is to assist nature in hastening the "pointing" process—*i.e.*, bring it to a head—and this is best done by constant hot fomentations and poultices. The stimulating effect of a mild blister will be found useful in cases where the abscess shows a disinclination to point outwardly. When the swelling becomes soft and fluctuating it must be freely lanced at the most depending part and the whole of the purulent matter liberated. The orifice must be kept open to admit of free drainage, the part well fomented, and then treated as a simple wound.

A fistula is the result of a deep-seated abscess which, from inability to point outwardly in the first instance, burrows amongst the structures by means of sinuses or channels, occasionally involving the spines of the vertebræ. This is the most serious and complicated of all the various descriptions of saddle injuries with which we have to deal, and requires the treatment of a skilled surgeon. It is generally necessary to make extensive incisions, so as to lay the diseased parts freely open, and frequently a counter-opening has to be made at the most depending points to admit of free drainage. Occasionally artificial inflammation has to be set up by means of a tape seton passed through the tissues, and frequently portions of diseased bone have to be removed. Some of the worst cases of fistulous withers I have ever seen occurred amongst the horses of the Auxiliary Cavalry in Zululand, to which I have already referred. Many of the injuries were of such a severe nature that extensive surgical operations had to be performed, and some of the cases were so bad as to necessitate the destruction of the animals.

Such a condition of things can only be described as the outcome of culpable neglect and mismanagement, and ought never to have been permitted to occur.

So long as our troop horses are doomed to carry the mass of dead weight now imposed upon them we cannot hope to abolish sore backs altogether, but I contend that by the exercise of ordinary care, and with a knowledge of the causes of these injuries and the best methods of prevention, they can be reduced to a minimum, while such cases as I have just described ought in future to be of extremely rare occurrence.

Frequent inspections of backs and saddles are necessary at all times, but especially are they of urgent importance on service. The horse's back is a highly sensitive structure, and oftentimes a very serious injury will arise from a very small cause. The hand should be passed carefully along the back of every horse daily, both in the direction of and against the hair, and any deviation from its natural condition should be at once noted and reported. These inspections should include all parts of the animal which come in contact with any portion

of the saddlery or accoutrements. The smallest swelling or accumulation of dried perspiration or scurf may, if neglected, occasion a severe sore; and, therefore, the necessity for care and vigilance in making these inspections cannot be too strongly impressed upon all concerned in the welfare of our troop horses. The above remarks will apply to the daily inspections and fitting of saddlery.

In conclusion, I am desirous of drawing attention to the advisability of establishing a systematic and thoroughly practical course of training in the details of saddle-fitting for the prevention and relief of sore backs, throughout our mounted services. Not only officers, but every non-commissioned officer and man ought to know something about the structures upon which the saddle rests, the varities of conformation, the causes which operate in the production of sore backs, and the expedients to adopt in order to prevent and relieve these injuries. How many men in a cavalry regiment know how a blanket should be folded to meet the various requirements of horses on active service? Very few, I fear; and yet this is a duty they may be called upon to perform at any time. The subject of saddle-fitting has been exhaustively dealt with by General Sir F. Fitz Wygram, in his pamphlet on "Saddling of Cavalry Horses," and also—from a veterinary point of view—by Veterinary Captain Smith, late of the Army Veterinary School, Aldershot, in a series of articles published in the "Quarterly Journal of Veterinary Science in India," 1883–84. The principles laid down are clear and sound, and as aids they are very valuable; but to be of real use they must be practically applied, and this can only be accomplished by a thorough course of training under competent instructors.

The Chairman—Would any gentleman like to make any remarks now?

DISCUSSION.

Lieut.-Colonel J. F. Brough, R.H.A.—After listening to the lecture which we have all heard from Colonel Walters, it seems to me that he has touched upon almost every point that any man who has to deal with horses could think of. I have never had any experience on service of the present system of placing the blanket under the saddle and the advantage which Colonel Walters says it is, but it certainly seems to me from what I have seen here that it is an improvement on the old patterns, which had a decided tendency in my mind to make the saddle rock, and also, as Colonel Walters has pointed out, it is more liable to vary; that is to say when you stuffed the saddle in one position, after the saddle had been on the horse's back six weeks or two or three months it varied, whereas if you stick to the plain pannel as may be seen there (*pointing to one of the model horses*) the plain bar saddle, you have a rigid structure which is the same at all times. Another disadvantage is that the pannel has a tendency to place the man too high above his work.

I agree with Colonel Walters as to what he said about the insufficiency of the size of the present blanket and chiefly for this reason: that the best battery and the best regiment with the horses in the best preparation for active service may start to-morrow, but those horses, as I have seen in Afghanistan, after long and severe work and with short commons, must lose condition, and when they lose condition the saddle which fitted them when they started will not fit them in two or three months. To obviate that, as Colonel Walters very rightly pointed out,

the only means that I can see is to have the saddles of sufficient size and a blanket of sufficient dimensions to enable the blanket to circumvent them.

As regards the matter of sore backs, I would like to mention a thing which I tried on two different occasions. When my battery, a Field Battery, was placed under orders to join General Stewart's column and go to Candahar, it meant a matter of hundreds of miles march over sand which was so deep that we used to have to call out a half battery at a time, take out its leaders and centre horses and place them in front of the other leaders and move the guns like that; and yet after marching up through the Bhow land we arrived at Candahar with almost a total absence of sore backs. What I tried was what I had seen done by an old line orderly, as he is called in India, a man who had had vast experience when such things as stables were unknown out there, and that was sopping the horses' backs and shoulders with salt and water day by day under the supervision of the salootri, and it had a most excellent result. When my battery (which I gave over when I was promoted) was leaving Rawul Pindi to embark upon the first large cavalry camp held under General Luck in India, with the prospect of several hundred miles march from Rawul Pindi to Umballa after that, and with the prospect of another cavalry camp when I got to Umballa, I tried the same thing and found exactly the same result. I do not know whether Colonel Walters has ever had any experience of that kind of treatment or not.

I thoroughly agree with what he said about the treatment of sore backs, because I happened at one time to be with my battery (I had been away on six weeks' leave) and the battery had received a new lot of saddlery and we were going on a long march. I do not know what it was that had happened, but all I know is that I was in charge of the horses, and had a great deal of experience of sore backs along that march. And I would impress upon every officer present the particular point which Colonel Walters has brought to our notice to-night as regards opening sores. A sore which is on a top surface like a horse's back requires to be particularly open so that it drains itself. If it does not do that (and I do not think Colonel Walters mentioned this point) if you open the sore perhaps a little too high the lower part of the sore does not discharge, and instead of the thing curing it spreads. And there is another thing I must say about this curing of sore backs. I have not had any experience except in India, but I used to find that one of the best methods of treating almost any sore out there was hot water, plain and simple. I have seen a thing out there (I do not know whether it is a feature of horse ailments in other parts of the world, but I dare-say Colonel Russell knows it well, it is a common thing in India) that is sore corners to mouths; you see a horse with a large indurated sore at the corner of his mouth. I have seen every kind of thing tried for it, this kind of powder and that, and at last a Veterinary Surgeon came to the place (poor fellow, he is dead now—he died of cholera in Afghanistan), and he recommended hot water. Hot water was applied, and the sores all began to go away.

Major W. L. Davidson, R.H.A.—There is one single point that Colonel Walters did not mention in the many instances which he gave of the sources of sore backs, and that is the advisability of constantly dismounting men on every possible occasion at the smallest possible halt. Colonel Walters alluded to the number of sore backs among the cavalry horses in South Africa. I personally had the good fortune to join a battery with colonial horses that had been all through the whole of the war before the second portion of the campaign to which Colonel Walters alluded, and I saw the horses that came out from England and the treatment they received. I do not know whether there are any officers present here who remember it, but on one occasion, soon after the English cavalry first came on to the field, they were seen (there was no mistake about it) to remain mounted in a halt in line for an hour-and-a-half with grass up to their horses'

knees, the horses looking wretched and wanting food, with the very best grass up to their knees, and yet not a single man was dismounted. The troops which had been there for a long time were always dismounted, and had off feeds at the slightest possible halt, even if only five minutes. That not only rests the men and gives them an opportunity of looking at the girths, but eases the horses in every possible way. I think there is a great deal of good sense in invariably dismounting the men whenever there is the slightest opportunity for doing so.

Major F. A. Yorke, R.H.A.—I think there is one cause of sore backs and collar galls which has not been referred to, and that is what I might call fussing. Sometimes men in charge of horses go round, in misdirected zeal perhaps, but because the pannels are hard, and because the collars have not been given up for some time, this is done when very often leaving well alone will save galls. I always think it is a good thing to remember what an old Sergeant-Major of a mounted battery once said, "Which is the easier to do, walk about in an old boot or a new one?" and very often I think that collars are touched up and the stuffing of saddles ripped up unnecessarily.

Lieutenant J. F. N. Birch, R.H.A.—With regard to the German blanket, I should like to say that I was visiting a German cavalry regiment this year, and the Colonel, whom I had every reason to believe, told me that all through the last manœuvres he had nothing but this blanket, and he had not a saddle gall in the regiment. Of course, *that* blanket (*pointing to the blanket on the model*) would be no good at all.

And one thing which I should like to know is why we cannot have a lighter saddle. *That* saddle there weighs 32 lbs. without even the shoes on, with absolutely nothing on; but if you go to any saddler in London he will make you a saddle of 14 lbs. Of course, our military saddle cannot be so light as that; but I take it that there is a tremendous difference between 14 lbs. and 32 lbs.

Major Horton (*Inspector of Saddlery*)—Colonel Curzon and Gentlemen, Colonel Walters has mentioned my name as if I had come to the lecture prepared to explain certain points in these saddles; but it is not so, I had no such intention. However, as I am well acquainted with the subject, and as you kindly invite me, I will endeavour to say a little to interest you on this important question.

First in reference to the blanket. The saddle blanket which we have here was not originally intended for a horse covering in lieu of the field blanket, although it is now to be so used. We must remember that the authorities in providing stores cannot advance with the rapidity of our thoughts and changing opinions. From present experience were a decision to be arrived at to-day, and were stores in accordance provided, the authorities would not, I think, be prepared to throw those stores away so soon as opinions changed on the pattern of that article.

I had the honour to be the Secretary of the Saddlery Committee of 1884, of which General Sir Frederick Fitz Wygram (who was then Inspector-General of Cavalry) was President. Several kinds of blankets were tried under his direction on the various field-days. The Committee's report was the outcome of practical experience and many trials; in some cases four lines in the report represent 40 days' work. It may be interesting to add that the Veterinary Department, of which our lecturer to-night is an able representative, have always advocated a very heavy blanket. It has been thought by many that they did not consider the question of the saddle, they simply wanted a covering for the horse; while, on the contrary, the other side thought a very heavy blanket under the saddle caused the animal to sweat considerably, that it placed the saddle too high, and that it did not afford the same means of varying the folds that a lighter blanket offered. With a very heavy blanket a deviation of a quarter of an inch of the points of the

front arch of the saddle—a question that is being ridden to death—becomes an absurdity.

It was intended that the blanket should be of medium weight for a saddle blanket; it was to be for stuffing, to be folded this way and that way as the officer superintending might wish, and that a heavy field blanket for standing camps should also be supplied when necessary. The saddle blanket can scarcely be considered a novelty in the service, for it was only in 1855 that a Committee recommended its abolition, and the substitution of the hair pannel. We may depend upon it that it took some time to work the change. Old soldiers have told me that at field-days, and on the march, men were constantly falling out to refix the blanket. But the saddle side-bars of those days were more like those on our pack saddles than on our riding saddles. In the year 1860 I was drilled on such a saddle; the seat was very short, and made more so by the leather seat of the shabracque and sheep-skin then worn over the saddle seat. I found it a very uncomfortable saddle, indeed.

The latest pattern blanket weighs 5 lbs. We are working towards a heavier pattern. If we do get to an 8 lb. blanket I think we shall have to try whether we cannot do without a numnah. You see *this* saddle-tree with the bare side-bars slips readily about on the blanket, while *this* saddle-tree, upon which we have a numnah pannel, with the slightest pressure grips the blanket.

We have on the saddle I see before me the 1884 V girth attachment. It was tried in 1884 in two regiments; one reported unfavourably and it was virtually set aside; but the other regiment held on to it for eight years and advocated it very strongly. The Royal Artillery Riding Establishment also had many saddles similarly fitted in use for some years, and I was told that they liked them very much. Now it has come in for all universal and drivers saddles. It is an excellent arrangement and is generally approved. We have also here two patterns of numnah pannels; one is the 1884 pattern, having a very narrow flap below the front arch points, while the other differs in having the narrow piece cut off. The narrow piece was left on, by those who designed the pannel, to take a portion of the pressure of the flap from the V attachment dee; it was also supposed to substitute the thickening of the front of the hair pannel flap. You will find that many horses fall away at the part upon which the front of the flaps rests, and hair pannels in consequence are invariably made with much more stuffing under the front of the flap than is used in the other part of the flap. This thickening affords the rider a more comfortable and effectual position of leg than if the pannels were not so made. Whichever numnah pannel we get, I am assured, from much experience with them, that they will be an improvement. So far as stuffing is concerned, the pannels weighing 1 lb. are more than equal to 3 lbs. increase on the blanket, as they place the padding just where it is wanted. Again, they prevent injury to the animal's shoulders should the front points of the saddle work over the front edge of the blanket; they raise the front arch over the wither, an absolute necessity on some horses; they allow additions of numnah to be readily added to suit peculiar conformation; they also save the side-bars from much rough wear. I hope we shall soon have them for every saddle used on a blanket.

The 1884 pattern girth, we have here, is half-an-inch wider than the previous pattern leather girth; it is split into laces so as to give a yielding part behind the animals elbows, and to ventilate the part. The length of the solid piece in the centre was determined after measuring a number of horses. The laces act somewhat like the yielding part of a gymnastic belt; they should be kept soft. It does not so much matter whether the other parts are so or not. The girth should get a good bearing on the under part of the animal's chest and on the body above the laces of the girth. The best girth, in my opinion, but it would be costly for universal saddles, is the broad woollen girth, which is used with a narrow one over it by many officers on their military and hunting saddles.

Cruppers, or no cruppers, have been much discussed, and many conflicting opinions exist, and will exist, on this question. I have had special opportunities of forming an opinion on this point. The cavalry regiment that I had the honour of serving in discarded cruppers, and, after working four years, took to them again; a period of three years elapsed and they were again set aside, to be resorted to once more after a few more years. My opinion is that a crupper is necessary for military horses that carry heavy weights, distributed as a kit is, on their saddles, at fast paces in close rank, and which may be called upon to jump a fence or obstacle in marching order. If you take the weight off you will not want the cruppers. I have seen horses with moderate shoulders in marching order without cruppers gallop at a fence, jump it in a roach-backed style, and land with the saddle and kit round their necks. I have seen horses refuse a jump and shape themselves in opposition to the rider, so that the saddle was completely out of place. Some persons state that because a crupper is fitted loosely it is not wanted. Certainly it is loose normally, but tight enough in the ranks under certain abnormal conditions such as I have mentioned. And to do without cruppers under all military conditions you want horses of such a shape that it is impossible to get them in large numbers. Horses being trained with running reins attached to the girth should wear cruppers.

The service attributes sore backs and girth galls in nearly every case to the saddle; while, in my opinion, four-fifths are from careless or bad riding and saddling. Sore backs are produced by the rider sitting back in the saddle with feet wedged in the stirrups, legs stiff and extended to the front. This style of seat causes the saddle to work forward and the rear points to unduly press. Other riders have an inveterate habit of sitting so that their saddles are tilted to one side, and a sore on the near side of the wither is in consequence produced. The rider's legs should be under his body and close to his horse's side; this will support and steady the saddle against the motion of his body. If with this seat he sits in the middle of the saddle, the girths will be relaxed and the weight will be distributed through the length of the bearing part of the side-bars. The stiff wooden-like rider causes the oscillation of the saddle by every movement of his body, and even when he is steady he produces undue bearing of the saddle on a limited area.

This girth will bind tightly against the wrinkled parts of the animal's body behind the elbows, if the rider is allowed to sit unduly on the hinder part of the seat, and should, as I have too often found it, the girth be hard and unyielding, it only requires the slightest peculiarity of formation to make a girth gall a certainty. A dodge I have seen tried, as a special case, on the line of march, when a horse was girth-galling from slovenly riding, was to loosen the girths after the man was mounted, to cause him to hold his saddle and himself steady on the animal's back by a proper position and grip of leg and steadiness of body. It was effectual.

A question has been asked why, if a hunting saddle of 14 lbs. weight can be procured, a military saddle cannot be made of similar weight. I would point out that a universal saddle is a baggage, as well as a riding, saddle, and that it has to carry from six to seven stone of kit in addition to the rider under service conditions. One condition, and a very severe test, is the pressure on the flank of a cavalry squadron when wheeling into line, particularly should one or two files become partly forced out of their places, and endeavour to regain them; the drag at such a time on the front of the saddle by the projecting cloak and wallets, caused by the colliding at full speed, is extremely severe on the whole structure of the saddle. No hunting saddle would under such severe conditions last a year.

It is a mistake, when fitting saddles, to seek a narrow arch, or a small size of saddle, as is too often done, to fit only the animal's shoulders. You may not know

that if the saddle-tree in construction is set at five inches across the top front of the side-bar, the side-bar is set at five inches apart at a point 14 inches from the front, and, if the front is six inches, the hind part is six inches; this affects the angle at which the side-bars lie. You must fit the back as well as the shoulders of the animal, to cause the saddle to ride well; and, if the two cannot be accurately fitted, a compromise is better than a special close fit at one point. Raise the arch, if it is necessary, by the numnah pannel.

In reference to the weight of the service saddle, *this* pattern 1890 steel-arch saddle-tree is as light as anything that can be made. Look at it. I have not heard anyone who has examined it carefully say that it could be made lighter. It stands under test a dead pressure of 7 cwt. on the crown of the arch—3 cwt. more than the unstrengthened angle-iron arch—and 1 cwt. more than the wood-arch saddle. Perhaps you may say, as others have said, that the bars may be broader; but do not forget that the blanket round it increases its bearing area, and so does the numnah pannel. To make it broader would be to increase its weight. Some have urged that we wanted a longer seat, a broader bar, a stronger saddle; but it must be a lighter saddle. If anyone can come forward and produce such an impossible article, the way is open. Some say that the 17¼-inch seat which we have on the angle-iron-arch saddle is too short, that it should be 18 inches; others says it is too long, it should be 16½ inches. It is impossible to reconcile the conflicting opinions on so important a question. If you make the seat over 17¼ inches, there is a difficulty with the kit to be carried behind, and, if you make the seat shorter, it is uncomfortable to a man over 11 st. in weight.

We have obtained the strongest and lightest tree than can be made for the service; but the arches are of steel, which will bend and get out of shape under certain conditions. One point I would allude to. When embarking the rule is to put the saddle in the corn sack with other kit, total weight about 6 st. The sack, with its contents, is placed with dozens of others and hoisted on board, and in some instances piled on each other 12 or 13 sacks deep, making up a weight of about 9 cwt., which, in many instances, would be pressing on the sides of the arches. Under such circumstances one must not be surprised to find, on disembarkation, that several have been pressed out of shape. The wood-arch saddle will stand more of such knocking about than steel or iron-arch saddles.

For artillery drivers no saddle could be more serviceable than that known as the Royal Artillery N.P. wood-arch, drivers. It is particularly suited for use with a blanket.

Many fads have been practised to prevent the rear points chafing:—Hinged rear points; specially curved side-bars; peculiarly stuffed pannels. Too often the particularly altered saddle is found on the wrong horse. The folding of the blanket will ease the rear point bearings; the numnah pannel with short pieces inserted will give a curved side-bar bearing, and allow alterations in a more easy and ready way than by making a special saddle.

The saddles of one regiment that I saw showed many special fads. I was informed that many of the horses had sore backs. The same regiment got a complete lot of new saddles (not steel arch) without a peculiarly altered saddle among them. I saw a report from that regiment which showed that they had marched some 200 miles without a sore back. Fads can be overdone, and often-times are mischievous.

I think I have said enough, gentlemen; but, in conclusion, I would add that in inspecting a number of mounted men it is surprising how many will be found with one stirrup longer than the other, or sitting unevenly in the saddle. Timely correction and careful watching, to prevent a continuance of such habits, will amply repay the trouble, and save many future chafes, girth galls, and sore backs.

Veterinary Lieut.-Colonel W. B. Walters—Gentlemen, as my lecture has already occupied so much of your time my reply must necessarily be very brief.

With regard to the salt and water treatment, referred to by Colonel Brough, it is an old and well-known remedy, and is very useful in cases of a simple nature. I am under the impression that I mentioned the reason for keeping open the orifice of a suppurating wound. The healing process must take place by granulation from the bottom, and if the orifice is allowed to close prematurely free drainage will be prevented, and the imprisoned matter will form another abscess.

As regards dismounting men when at a halt, that is a question of discipline with which I have nothing whatever to do, as it does not enter into the scope of my lecture. There can be no doubt, however, that men should be dismounted whenever it is practicable, and the remedy for an omission of this sort is in the hands of the military authorities.

I am very pleased to hear Major Horton say that the Saddlery Committee are "working towards a heavier blanket," and that he thinks they will have to try whether the numnah can be dispensed with. These are points that I, and others, have advocated for many years, and I hope the day may not be far distant when the 8 lb. blanket, without the numnah, will be substituted for that at present in use. Except to express a regret that Major Horton and I disagree with reference to the use of the crupper, I do not think I have anything to say in reply to the very interesting and instructive remarks with which that officer has favoured us.

The Chairman—Gentlemen, I had made a few notes during Colonel Walters' lecture of some points upon which I had intended to touch, but I think as the hour is now a little late, and as I do not think I can throw any further light upon the subjects beyond what Colonel Walters has told us I think I had better tear them up. Colonel Walters told us that he was not able to go into details, but what he told us has been most interesting and admirable in every way. I am wondering whether he could not give us another lecture, but I suppose his time will not admit of it. However, I am sure you will all agree with me in thanking him very heartily for coming here on Monday evening and again this evening, and for the admirable way in which he has lectured to us. (Applause).

NOTES

ON THE

NAVAL MANŒUVRES OF 1894.

BY

CAPTAIN R. A. K. MONTGOMERY, R.A.

The naval manœuvres which have lately terminated have been so fully described and discussed in the daily papers that I feel it is almost superfluous to write about them, but, having had the good fortune to attend them, and having found them full of interest and instruction, I trust that the following notes may be of assistance to those of my brother officers who are anxious to understand the manœuvres of the sister service.

Umpire's Rules.

In naval, unlike military, manœuvres the umpires are not present, they await in London the various reports sent to them from time to time, and base their decisions on these reports; consequently, to assist them and, at the same time, to give the Commanders of Fleets something definite to go on, each ship is given a fixed value. Thus, a battle-ship of the newest pattern, such as the *Royal Sovereign*, counts five points; other battle-ships of an older pattern and slower speed, such as the *Devastation*, also 1st class cruisers, such as the *Australia*, count four points; whilst the 2nd class cruisers, such as the *Apollo*, count one point.

The torpedo-catchers and torpedo-boats have no value assigned to them, and consequently, in a general action, do not directly assist in determining the result. Further, in the event of a general engagement, in order to gain a victory, unless one side can engage the other in overwhelming strength, the winning side must have a strength (counted by the points) one-ninth greater than that of the weaker, and must keep the latter under fire for two hours at a range not exceeding 4000 yards.

This then was the aim of the Commanders of the Red and Blue Fleets, to assemble at some point a fleet of the necessary strength to be able to engage the other side and claim a victory.

The problem, however, was greatly complicated by the different

strengths and speeds of the four divisions in which the fleets were divided. Thus :—

RED SIDE. Vice-Admiral R. O'B. FitzRoy, C.B.		BLUE SIDE. Rear-Admiral E. H. Seymour, C.B.	
THE "A" FLEET. Vice-Admiral R. O'B. FitzRoy, C.B.	*THE "B" FLEET.* Rear-Admiral A. T. Dale.	*THE "C" FLEET,* Rear-Admiral E. H. Seymour, C.B.	*THE "D" FLEET.* Rear-Admiral E. C. Drummond.
1*st Assembly, Portland.* 2*nd* „ *Falmouth.*	1*st Assem. Bearhaven.* 2*nd* „ „	1*st Assembly, Torbay.* 2*nd* „ *Queenstown.*	1*st Assembly, Milford Haven.* 2*nd* „ *The Shannon.*
Group (1): 5 *ROYAL SOVEREIGN*; 5 *RESOLUTION*; 4 *DEVASTATION*; 4 *BLENHEIM*; 4 *ENDYMION*; 4 *BONAVENTURE*	5 *EMPRESS OF INDIA*; 5 *REPULSE*; 4 *CONQUEROR*; 4 *ASTRŒA*; 4 *THESEUS*; 4 *GIBRALTAR*	5 ALEXANDRA; 5 BARFLEUR; 5 BENBOW; 4 INFLEXIBLE; 4 COLOSSUS; 4 EDINBURGH; 4 St. GEORGE	4 WARSPITE; 4 AURORA; 4 GALATEA; 4 AUSTRALIA
Group (2): 1 *BRILLIANT*; 1 *SAPPHO*; 1 *SCYLLA*; 1 *TERPSICHORE*; 1 *THETIS*; 1 *RAINBOW*	1 *LATONA*; 1 *ANDROMACHE*; 1 *MEDEA*; 1 *MEDUSA*; 1 *PEARL*; 1 *BARROSA*	1 MERSEY; 1 MELAMPUS; 1 TRIBUNE; 1 INTREPID; 1 IPHIGENIA; 1 INDEFATIGABLE; 1 PIQUE	1 SYBILLE; 1 NAIAD; 1 APOLLO
Group (3): *SPEEDY*, *CIRCE*, *RENARD*, *SEAGULL*, *SPEEDWELL*, *ANTELOPE*, *RATTLESNAKE*, *SPIDER*, *HAVOCK*, *HORNET*	*ALARM*, *ONYX*, *SHELDRAKE*, *GOSSAMER*	NIGER; JASON; LEDA	HEBE; DRYAD; SALAMANDER
TORPEDO BOAT FLOTILLA, &c. 1*st, Assembly, Portland.* 2*nd* „ *Belfast.*		*TORPEDO BOAT FLOTILLA, &c.* 1*st Assembly, Falmouth.* 2*nd* „ *The respective Stations.*	

Special Service Vessel.	Torpedo Boats.	Station.
RUPERT	45, 52, 53 80, 85, 87	Belfast.

Special Service Vessels.	Torpedo Boats.	Stations.
CURLEW	50, 59, 60	Holyhead.
TRAVELLER	26, 27, 93	Waterford
MAGNET	66, 77, 79	Kingstown
BULLFROG	64, 65, 67	Milford Haven.
BASILISK	81, 83, 84	Queenstown.
TRENT	72, 73, 74	Piel (near Barrow-in-Furness).

Strength & disposition of Fleets.

A. Red fleet, counting 32 points, besides 10 torpedo-catchers, was assembled at Falmouth; the "lame duck" of this division was the *Devastation*.

B. Red, also counting 32 points and four torpedo-catchers, was assembled at Bearhaven; this division was hampered by the *Conqueror*.

C. Blue, counting 38 points and three torpedo-catchers, was assembled at Queenstown. The *Colossus*, *Edinburgh*, and *Inflexible* were all comparatively slow.

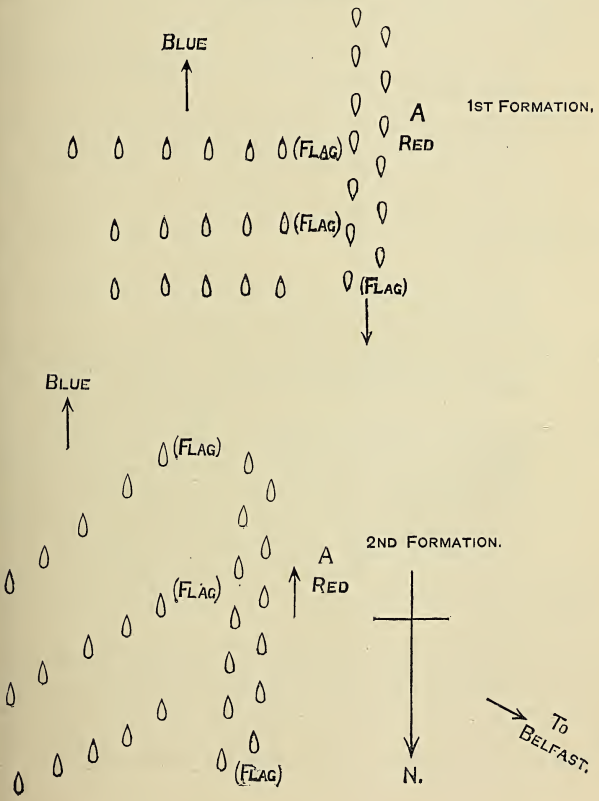
D. Blue, counting 19 points and three torpedo-catchers, was assembled at the mouth of the Shannon. This division, consisting of only 1st and 2nd class cruisers, possessed a fairly uniform speed.

The Red fleet then counted 64 points against 57 points of the Blue, and these seven points would be sufficient to ensure victory to Red could its two divisions only unite before engaging Blue.

Strategical problem to be solved.

A glance at the accompanying map shows us plainly the strategical problem which had to be solved: the two divisions of Blue are interposing between the parts of the divided Red.

FORMATIONS OF THE BLUE AND A. RED FLEETS DURING THE BATTLE OFF SOUTH ROCK.



Situation considered for military point of view.

Let us suppose for a moment that we are considering land operations; what would be the probable action of Blue? Briefly this: form a Central Reserve, delay the enemy on either flank by means of small retarding forces, and throw the weight of the reserve, combined with these retarding forces alternately, against the separated divisions of the enemy.

To apply this principle to the members actually engaged, we might have—

D. Blue (19 points) to retard B. Red (32 points). The seven 2nd class cruisers and three older battle-ships of C. Blue (19 points) to retard A. Red (32 points), and a Central Reserve, consisting of three 1st class battle-ships and one 1st class cruiser of C. Blue (19 points), ready to throw its weight to either flank and so raise the total to 38 points, sufficient to ensure victory.

Conditions necessary for successful action.

But to hope for success from such a disposition three things would be necessary:—

(*a.*) The country must be favourable in the way of obstacles for the retarding forces, otherwise they would be destroyed before help could arrive.

(*b.*) The communications from flank to flank must be such that the Central Reserve would have freedom of movement.

(*c.*) The territory in which the Central Reserve is operating must be able to furnish it with supplies.

Let us return now to the naval problem and see if any of these three conditions were present:—

How far fulfilled.

(*a.*) In the open sea there are no obstacles, and owing to the umpire rules, no retarding force of Blue could delay its adversary without being itself destroyed.

(*b.*) The communications were not open, as the narrow strait opposite Belfast must be traversed. Belfast was a hostile fortified port, and contained a torpedo-boat flotilla.

(*c.*) For a fleet "supplies" is only another word for coal, and from Broadhaven to Dublin on the Irish Coast, or to Whitehaven on the English, there was no point at which the Central Reserve could coal, and, consequently, after a very short time it would have to leave its central position in order to replenish supplies, and then one or other of the retarding forces would be liable to be destroyed.

Clearly, then, the strategy suitable to the land problem was totally inapplicable to the naval one. Let us see how Admiral Seymour proposed to solve it.

Admiral Seymour's plan.

Knowing that many ships of the Red fleet were faster than his own, he determined to hurry both his divisions north, endeavour to form a junction off Belfast, and then turn on whichever of the Red divisions should be near him, in the hopes of crushing it before the other could arrive.

C. Blue had nothing to fear from A. Red, the points being 38 to 32,

but it was all important for D. Blue to approach C. Blue as quickly as possible, as its 19 points would be of no avail against B. Red's 32.

Great uncertainty was introduced into the problem, owing to the fact that the various divisions were to start, on war being declared, from points which were kept absolutely secret.

Movements of D. Blue.

Let us follow now the movements of D. Blue fleet under Admiral Drummond.

Having arrived at the mouth of the Shannon on Monday, 30th July, the ten ships composing this division coaled, and then awaited orders from London, which arrived on Thursday, 2nd August. At 5.30 p.m. on that day anchors were weighed, and the fleet stood out to sea in "column line ahead," the *Warspite* (flagship) leading. The sealed orders were to proceed to a point in the Atlantic, 100 miles due west of the Shannon, and not to leave that position until 9 p.m. on Friday, 3rd August, when hostilities would commence.

Shortly after clearing the river the three catchers formed a second column to port of us, the 2nd class cruisers later on forming a third column to starboard.

At 9 p.m. on Friday the signal was made to proceed at 14½ knots on the pre-arranged course, about north by east; this was continued till about 8.30 a.m. on Saturday, when we were off Broadhaven. The *Salamander*, torpedo-catcher, had disappeared during the night, and it was feared that she had broken down and would fall into the enemy's hands.

Hostile cruisers in sight.

At 12.45 p.m. a steamer was sighted inshore, all the ships hoisted the flags of various nations as a challenge to the stranger, and the *Apollo* and *Sybille* were sent off to reconnoitre her, the *Naiad* following, as a second steamer had come in sight near the first. Our scouts soon reported that these were two of the enemy's cruisers, who must have passed us in the dark. The strangers steamed away in a south-westerly direction, evidently to report, and our cruisers were recalled, rejoining us about 2.30 p.m. off Tory Island. At 5.25 p.m. we were off Inishtrahull, and the hostile cruisers were again seen to be following us at a respectful distance.

Dryad breaks down.

At 8.25 p.m., when off Rathlin Island, the *Dryad*, torpedo-catcher, was seen to be in trouble, and the *Australia* was ordered to stand by and, if necessary, take her in tow. By the time the defects were made good, we had lost sight of the remainder of our fleet, and had to make the best of our way to one of the rendezvous previously settled by the Admiral in the event of ships becoming detached from the squadron.

D. Blue attacked by torpedo boats.

About 10.30 p.m. the flashing of rifles and repeated use of search-lights at some distance off on our port bow indicated that an attack by torpedo-boats was being carried out against a number of vessels, which proved to be our own squadron, and which we rejoined shortly after midnight. But before doing so we were ourselves attacked. The watch had hardly been mustered when, about 12.15 (midnight), a torpedo-boat suddenly appeared on our starboard quarter, but so heavy a fire was opened upon her that she disappeared in the darkness without having done any damage.

C. & D. Blue form a junction.

About 1 a.m., D. Blue and C. Blue fleets joined off the South Rock,

and shortly afterwards turned north to crush B. Red before it could reach the shelter of the forts at Belfast.

H.M.S. *Australia* again attacked.

About 3 a.m. the *Australia* was again attacked by torpedo-boats, one approaching on either quarter, and this time the attack was nearly successful, a torpedo passing only some 20 yards in front of our bow. Both the boats were claimed to have been put out of action, and one was discovered by means of the search-lights to have been a friend!

B. Red sighted.

Soon after daybreak (Sunday) one of our cruisers discovered B. Red fleet near The Maidens, and hugging the coast, so as to gain Belfast without encountering us.

Battle off "The Maidens."

At 5 a.m. Blue fleet advanced to cut off the enemy, D. Blue in "column line ahead," C. Blue on our port side in "column of divisions line ahead." At 5.45 our cruisers opened fire, the enemy replying. The fleets continued to approach Belfast Lough parallel to each other, and keeping up a heavy fire, but as no ship was allowed by the rules to approach within eight cables of an enemy, it was impossible for us to prevent them from gaining the Lough. At 6.45 a.m. the *Colossus* and *Edinburgh* were signalled "to chase," and they wheeled out of the column and engaged at closer quarters, with a view to cutting off the *Conqueror* and 2nd class cruisers, but having approached too near to the imaginary forts, they were eventually ruled "out of action" by the umpires. At 7 a.m. "cease fire" was sounded. Thus B. Red had only been under fire 1¼ hours, but the odds had been so overwhelming, 50 to 30, that Admiral Seymour claimed a victory, which the umpires allowed.

A. Red sighted.

Scarcely had the Blue ships drawn off when, at 7.15 a.m., seven cruisers belonging to A. Red fleet were sighted to the south, and we discovered that we had had a very close shave of being caught between two fires.

The Blue fleet immediately started south to crush A. Red, the formation adopted being "columns of divisions line abreast," D. Blue leading.

Battle off South Rock.

At 9.30 a.m. A. Red was seen approaching in "single column line ahead," the catchers forming another column inshore of the remainder. Blue continued to advance, passing the Red to starboard, and at 10.20 a.m. fire was opened. At 10.25 a.m. the whole of the Red ships "went about," this manœuvre bringing the two fleets parallel to each other, and moving south, away from Belfast. Meanwhile B. Red was seen to have left Belfast and to be following us, so that, should our claim to have defeated them in the morning be disallowed by the umpires, we were now liable to be defeated ourselves. But A. Red's manœuvre appeared premature, as B. Red was not yet within supporting distance, and every minute the battle was moving further away instead of approaching the wished-for supports.

Admiral Seymour now altered his formation, each line forming "quarter line disposed to port," or, in other words, an échelon retired from the right, the flagship being on the right. By this means the ships were able to bring a heavy fire to bear on the various Red ships, but from an outsider's point of view the change of formation was delayed a little too long, as the Red ships when moving north had a

chance of enfilading each line of Blue as they passed, and the fire of the latter was masked by their own ships.

Blue's formation.

The advantage of Blue's original formation was now apparent, for had Blue advanced in "column line ahead," as Red did, instead of "column line abreast," the two ends of the column would not have been within supporting distance of each other, and B. Red would at once have cut off the rear of it.

The fight continued until 12.30 (noon), when, having kept A. Red under fire for two hours, Blue fleet hauled down the "engaging signal," and the Admirals of the Red and Blue fleets agreed to haul off, proceed to different ports, and there await the decision of the umpires. The Red fleet steamed off to Belfast, C. Blue to Kingstown, and D. Blue to Holyhead. To say that the battle was a grand sight is to express very tamely a spectacle which must have stirred the heart of the most phlegmatic Englishman.

Complete control of units during the fight.

From a soldier's point of view, the most noticeable detail was the absolute control that each Admiral had over the units composing his command, signals were hoisted, answered immediately, and then acted on; whether this would be the same in real warfare is a very open question, as the signalmen are in a very exposed position, and halliards and semaphores would be very liable to be shot away.

Tube cannon for training gun-layers.

Arrived at Holyhead, D. Blue again coaled, and on Tuesday, 7th August, the umpire's decision arrived, stating that the claims of Blue fleet had been allowed, and that the manœuvres had consequently come to an abrupt termination. Preparations were at once made for the target practice, one of the most important of these being the exercising of the gun-layers with "tube cannon." So much weight does the Admiralty lay on the employment of this instrument that a ship of the size of the *Australia* must fire 3000 rounds each quarter, and may fire an unlimited number. As it would seem to be an invaluable addition to our course for training, and perhaps a satisfactory method for examining, our gun-layers, the following is a description of the instrument for those who have not seen it. It is known as "the Morris Aiming Rifle," and consists of a rifle barrel which is held in an expanding frame, by means of which it can be firmly fixed in the centre of the bore of a gun of any calibre. On the breech end of the rifle barrel is a bayonet-joint arrangement, by which an electric or percussion breech-piece is attached to it. The gun is layed with the ordinary sights. Changes in war material for June contain an instrument for the same purpose, so perhaps we may soon hope to have it.

Morris aiming rifle.

The above notes have far exceeded what I had intended; I trust they will be of interest, but, whether they are or not, I would strongly advise anyone who has the chance, to attend naval manœuvres; he will find them not only interesting but instructive, and they will upset many ideas about sea life which are formed during voyages on H.M. troopships.

DEFENCE OF ESTUARIES, HARBOURS, ETC., AGAINST TORPEDO-BOAT ATTACK.[1]

A REPLY.

LIBRARY, NOV 26 1894, U. S. PATENT OFFICE.

BY

LIEUTENANT G. G. TRAHERNE, R.A.

With reference to the above paper, which appeared in the March number of these "Proceedings," I venture to submit the following remarks:—

Electric Search-lights.

Firstly, with regard to the form of light to be employed—the dispersed beam, as shown in the cut, is seldom if ever used; the usual practice being to place the arc in the focus of the parabolic reflector, and so produce a parallel beam which gives the maximum intensity of light at the maximum distance.

If we consider the coned beam, two cases arise:—

1st, the cone of dispersion; and
2nd, the cone of concentration.

With the first, the illuminated area is increased, but the intensity, and, consequently, the distance at which an object could be distinguished, is correspondingly diminished.

In the second case, which would never be employed until the object had been discovered, the illuminated area is diminished but the intensity is increased.

The intensity evidently varies inversely as the cross section of the beam; so that if—

I = intensity of parallel beam at distance x from mirror.
i = „ „ coned „ „ „ „ „
a = area of cross section of coned beam at distance x from mirror.
A = area of cross section of parallel beam.
and θ = angle of cone,

then $\frac{I}{i} = \frac{A}{a} = \frac{d^2}{D^2}$ where d and D are the diameters respectively of the areas a and A and $d = D \pm 2\,x \tan \frac{\theta}{2}$. The positive sign for the cone of dispersion and the negative for the cone of concentration.

[1] *See* R.A.I. "Proceedings," p. 109, No. 3, Vol. XXI.

Fig. 1.

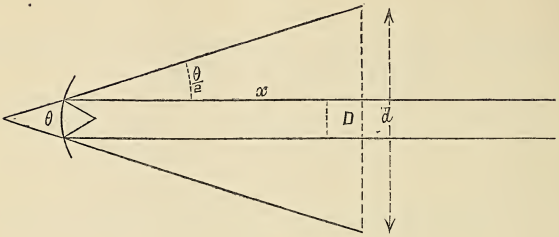
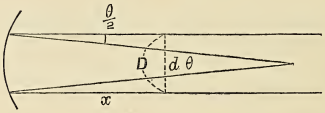


Fig. 2.



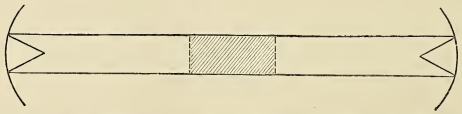
These formulæ are, of course, not strictly accurate, but sufficiently so for all practical purposes.

It will be seen that the particular form of beam to be employed depends very much on the width of the estuary to be defended, and the dispersed beam as suggested by the author could only be used with effect in very narrow channels. On a clear dark night, with everything favourable to the defence, a boat could be discovered by aid of the dispersed beam at a distance not much exceeding three-quarters of a mile, while, by employing the parallel beam, this distance is increased to between 3000 and 4000 yards.

Secondly, with regard to the particular arrangement of the beams as suggested in the paper, the following objection may be urged:— That neither of the operators at the projectors would be able to see anything in the diamond-shaped area on account of the opposite light shining in his eyes; also, it is a well-known fact that it is impossible to see anything on the further side of a beam of light, so that the look-out men would have to be stationed outside, and on both sides, of the illuminated area.

Taking into consideration that, though narrower, the parallel beam gives the more intense light, with greater distance, than the dispersed beam, it would, perhaps, be better to employ it, and two methods of fixing the beams could be resorted to: one by forming a single parallel beam, the two lights overlapping more or less (Fig. 3); the other by

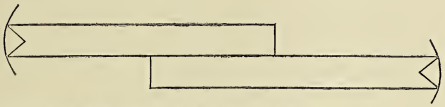
Fig. 3.



throwing the beams parallel to each other and touching, and overlap-

ping at mid-channel (Fig. 4). The first giving the more intense light

Fig. 4.



at mid-channel, but the second the broader area.

Defeat of Attack.

Capt. Wray appears to be doubtful of the efficacy of light quick-firing guns against torpedo-boats, and has a leaning towards the employment of heavy guns with case or shrapnel. This is surely a retrograde step, for, from experience gained by the Royal Navy over a number of years, the conclusion has been arrived at that heavy guns, at anyrate with ordinary gunpowder, do more harm than good and favour the attack by forming a smoke-screen in front of themselves, and light quick-firing guns were specially introduced for use against torpedo-boats.

In fact, the Navy have a way of stationing their ships' companies for repelling torpedo-boat attacks (which they call "man and arm ship," and which differs from the ordinary "action" station), when only the light quick-firing and machine guns and small-arms are used, the heavy guns' crews providing their arms and manning the superstructures, &c.

A number of experiments were carried out by the Navy against a dummy torpedo-boat towed past at various speeds and distances, and the result was the introduction of light quick-firing guns and the abolition of case shot for heavy guns. The records of these experiments is, I believe, to be found in the "Gunnery Manual for the Fleet."

Whether the introduction of smokeless explosives will necessitate or result in the re-introduction of case shot and the use of heavy guns, against torpedo-boats, remains to be seen. However, as long as ordinary powder is employed, the defence, from a gunnery point of view, must, I think, be entrusted to quick-firing and machine guns and small-arms.

Royal Artillery and Royal Navy.

It appears to have been overlooked that the defence of harbours, &c. belongs as much to the Royal Engineers and submarine miners as to the Royal Artillery and Royal Navy; however that may be, the relative parts to be played by the services will greatly depend on the local conditions.

Where a boom is used, which to be of any use must be carefully prepared and not thrown up in a hurry, it should be inside the illuminated area and so placed that the defence outside of it may be entrusted entirely to the Royal Artillery and Royal Engineers, and that inside entirely to the Royal Navy with their vidette and torpedo-boats.

The Royal Engineers' defence would probably consist of a system of electro-contact boat mines and a few observation mines in the illuminated

area; but the best positions for these perhaps would be between the illuminated space and the boom. The guns should not be able to be trained so as to fire on the boom; and the search-lights should be placed near the water level so as to prevent any part of the channel near the shore being left in the dark.

Finally, it would be of very great advantage if the yearly Naval Manœuvres were carried out in conjunction with local Artillery and Engineers, thus, as Capt. Wray suggests, the services would be enabled to gain experience of each other's methods of working in time of war.

A REPLY.

BY

CAPTAIN H. C. WILLIAMS-WYNN, R.A.

I HAVE waited with some interest the periodical appearance of the "Proceedings" since March, in the hope that it would contain some further contributions to an interesting discussion which might be raised upon Captain Wray's paper. As, however, there seems to be some danger of the subject being allowed to drop, and as my own conclusions are not identical in all respects with those of Captain Wray, I venture to put forward my own views, in the hope that, by keeping alive the discussion on this subject, we may elicit some really valuable information from abler pens.

Now, before entering on the questions raised by Captain Wray, as to the best means of discovering and defeating torpedo-boat attacks, it seems to me that we should first consider the possibility and probability of such attacks with regard to the situation and local conditions of the port attacked. It is clearly a work of supererogation to provide means for repelling such attacks, if all naval experience tells us that, in such a situation, they are impossible. Again, we are not warranted in demanding more than a very moderate expenditure on special defences against such attacks if it can be proved that, though possible, they are in the highest degree improbable. Let us take as an example a port such as Harwich.

Colomb and Mahan teach us that attacks on territory by ships have never succeeded and never will succeed unless the attacker has, at least temporarily, the command of the sea, but raiding attacks may be made with some hope of success from what they call an indifferent command of the sea. If an enemy has, even for a time, the command of the channel, it is hardly conceivable that he would utilise it to attack so pitiful an objective as Harwich. But with an indifferent command of the sea, or one believed to be indifferent, such attacks are possible. With what object then would they be made? Remember the class of attacker we are pre-supposing. There can be no question of holding a town to ransom, destroying docks or threats to bombard the town. Take four boats, the maximum number supposed by Captain Wray: they are evidently perfectly innocuous till they reach their goal, what-

ever it may be, for a few 3-prs. or possibly 6-prs. on a platform vibrating like the strikes of an electric bell, may be disregarded as boding any danger to the defence. They arrive among the shipping, those of them which have not run aground at least, they must surely slacken speed now, and look about for something worth blowing up, for if they continue rushing on at 21 knots their bold enterprise will end by crashing into a few colliers or coasting vessels, which will hardly repay the cost of the boats lost. However, the port would scarcely have been selected for attack unless the enemy had reliable information that a valuable battle-ship or cruiser was lying there. The torpedo-boats slacken speed then as they come into the harbour and, making for their objective, prepare to discharge their torpedoes at her. Probably she has her nets down and in any case she will make it pretty lively for the boats with quick-firing and machine gun fire. It is unlikely that a solitary British ship would put into Harwich unless disabled in some way; when lying there to refit temporarily, she would surely improvise a boom to protect herself from torpedo attack, and would organise every arrangement necessary to prevent being surprised. The torpedo-boats have practically no men to land, in order to set fire to warehouses, wharves, etc.; a picquet of the local volunteers would be sufficient to guard against any thing of this nature. And then their return? It is just getting daylight perhaps, and the forts are now all thoroughly aroused, batteries manned, and infantry lining the parapet with their magazine rifles. I think neither boats nor crews would ever see that continental port again, whence they emerged the afternoon before to set out on their forlorn hope.

There are places, however, where the conditions are extremely favorable to torpedo-boat attack; I do not think they are many, but Malta is undoubtedly one of them. The means of detection by day-light requires no comment; half-an-hour's warning of their approach is more than sufficient in the day-time; but by night the difficulty is very greatly increased. The electric light is our only resource and that, I fear, leaves much to be desired.

I cannot quite follow Captain Wray in his analogy of the field army and its requirements in the matter of outposts. It must be remembered that our fleet is the field army and guards its own front and line of communications; we are at the base of operations, and our outpost line may be proportionately restricted. As Defence Committees have drawn up for each of our coaling stations, the best way of meeting every probable form of attack, I do not care to discuss the best method of employment of the electric light as applied to any particular locality. The fixed beams and the broad belt of light proposed by Captain Wray seem to me eminently sound, but I am not quite sure that I should be very liberal with the search-lights (movable beams); these latter are two-edged weapons, dangerous to friend as well as foe unless very carefully regulated.

As regards the means to be adopted for defeating these fast torpedo-boats, I believe the quick-firing gun is the weapon to rely upon. It would be interesting to know upon what foundation Captain Wray bases his distrust, or rather disbelief, in the power of this handy little gun to deal with fast travelling boats.

I have personally availed myself of every opportunity to see practice from quick-firing guns, since I have been stationed in a coast fortress, and I may have seen 250 to 300 rounds fired. The target was generally moving at a rate not exceeding four miles an hour, I am bound to say, but that was not the fault of the gunners. Every shot was recorded by the range officer on the tug; this prevents the guns firing at their quickest rate, as the difficulty of recording successive rounds becomes considerable. It would be better I think to fire, say thirty rounds, at the quickest possible rate, and let the range officer give a general opinion as to the effect of the series. But from the experience of the practice I have seen, and considering the great improvement in shooting which the layers made after a certain number of rounds, I make bold to assert that 6-pr. quick-firing guns are preferable to the heavy guns firing case shot for the purpose of defeating torpedo-boat attacks. With heavy rifled muzzle-loading guns loaded and laid on a certain line, you can only fire each gun once as the boat crosses in that line, or again at the following boat if you have time to re-load; for the traversing gear will not enable you to catch the torpedo-boat up if it has crossed the line on which the gun was laid, before the alarm is given, or before the detachment is ready. At the entrance to harbours, guns are usually mounted in casemates, with 300 or 400 yards of "dead water" under them.

Heavy shrapnel, I am afraid, I regard as even more unsuitable for the purpose than heavy case shot; it is like partridge shooting with a blunderbuss. But Captain Wray says nothing of rifle fire, though he alludes to the Maxims, which latter, he says, would certainly hit the boat, but would scarcely stop it. Now, the man at the wheel in a torpedo-boat is quite exposed, and I believe that several of the crew would be necessarily exposed also; without sinking the boat you could practically prevent her attaining her object, by successfully attacking the *personnel* by the infantry fire of magazine rifles and rifle-calibre machine guns. I believe this, in conjunction with a liberal supply of 6-pr. quick-firing guns judiciously placed, to be the solution of the problem "How to meet a torpedo-boat attack."

With the last part of Captain Wray's article, dealing with the relative parts to be played by the navy and artillery in defence against torpedo-boat attack, I most heartily concur. The Royal Navy, Royal Artillery and Royal Engineers must work together on a previously thought-out system. Such schemes are drawn up, I believe, but much advantage would accrue if they were communicated and explained to the subordinate officers of the corps concerned. It would be useful if artillery officers, of not less than three years' service, could be attached to a ship for a fortnight, which should include at least one of her periodical practices, in the same way that we are allowed to be attached for a short time to an infantry battalion or a cavalry regiment. They would not be much in the way; they would pick up much that was useful to a coast artilleryman, and a comparison of the naval gunnery methods with those of coast artillery might be of interest to the naval officers themselves.

NIGHT FIRING AGAINST TORPEDO-BOATS.

BY

CAPTAIN H. T. HAWKINS, R.A.

It is proposed to put forward a suggestion for improving existing armaments for this work—it is very simple, and has doubtless occurred to many officers of the Regiment.

Our large masonry forts at home stations, although not now suited for their original purpose of engaging an enemy's battle-ships, have enormous capabilities for stopping boats—they contain large numbers of guns close together, rendering control comparatively easy, and have many other manifest advantages which it is unnecessary to enumerate. Are our present arrangements for night firing the best we could have?

Would it not be well to have all anti-boat guns in these forts fitted with electric firing-gear, the keys centralised in the Fort Commander's station, which would be, at night, on the top of the fort in nine cases out of ten? The permanent R.P. bearings being cut in concrete, or drawn on a fixed chart, with their firing keys immediately under them. These keys need not differ much from ordinary bell-pushes with some simple form of guard, possibly like that over one mark of direct-action fuze. The electric gear should, besides, give a signal in the Fort Commander's station when its group was loaded, laid and connected up, and also light a small, red, incandescent lamp over each gun, to warn the detachment, or anyone coming into the casemate, against touching the gun or standing too near it.

The advantages for night-work over any system of friction-tube firing are obvious. The Fort Commander (actual or acting), the man of all others who must be keenly on the alert all night, has the important group for night-work, literally under his thumb, and by a simple word to the officer or selected non-commissioned officer in charge of the firing gear, can fire any group at a moment's notice. No rousing up of sleepy men, and zealous, but confusing, shouting of a number of indistinct orders—very likely in a high wind or heavy rain; no firing of B and D groups when E was ordered; no burst of independent fire, leaving the fort offenceless for some minutes, because a ship was sunk the night before, and everybody has an exaggerated idea of the speed of a torpedo-boat, and the necessity of loosing off in time. We are dealing, it must be remembered, with young soldiers and auxiliaries, half awake, in their first experience of real excitement.

With electric firing-gear all the gun-detachments of guns laid on permanent R.P. bearings, and most of them must be so, against a target coming in 15 yards a second, would sleep round their guns; the only people on the alert being the Fort Commander, his assistant for firing, range-finders and search-light men, with one telephone man (to telephone exchange), and the sentry on the gate. There could be no demoralising false alarms, as everybody except those mentioned would

be asleep until the first group was fired, *i.e.*, until it was definitely ascertained that the alarm was not false. Then the detachments whose red lights were out would hasten to reload, while the others would stand ready to do so when required. On the many nights on which no enemy appeared, the men would get a whole night's rest, while the fort would, nevertheless, be quite ready for action. This consideration is perhaps the most powerful of all, as night-work wears troops out quickly, and our probable numbers are insufficient to give relief detachments in most cases.

If the Fort Commander does not stop the boat with his first fire he would wait for her on the bearing of the next group, allowing a little more for "travel of target," perhaps. If there are several boats or lines of boats, at irregular intervals, the form of attack we may confidently expect, he has every chance of disposing of them effectually with a minimum expenditure of ammunition, and with no chance of confusion on the gun-floors.

The usual objections to fittings of this sort, are the difficulty of getting money, in this case but little would be required; and hesitation about increasing the number of "jim-crack" appliances. The latter will hardly hold water, as the forts in question will keep out any but the largest shell, and when hit by them would probably collapse like a child's card-castle—guns, gunners, jim-crack fittings and all—as regards the part struck, and a good deal round it. Besides we have it on the best authority that they are only likely to be attacked by ships when we have entirely lost the command of the sea, while boat raids will probably be, like the language of Truthful James's friend "frequent, and painful, and free,"—commencing, as last year's Prize Essay shewed us, a very few hours after declaration of war.

As to grouping for electrical firing, that is clearly a matter for experiment and local consideration; probably a good general rule would be to group guns in pairs, each pair to cover a range of, say, 400 yards of water; two or more groups might, of course, be directed on the same bearing, with case or time-shrapnel according to range. This is now done in many forts, no doubt, but I have not heard of any system of centralised electric-firing. It surely would be more easy, more sure, and more economical of ammunition than any other.

We seem rather to train for the attack which we need not expect, to the detriment of that which we are bound to expect, in many ways. Surely the two most likely attacks (and they may well be combined into one), are night-attack by boats, to be met by M.L. guns at short ranges; and distant, and more or less casual, bombardment, to be met by deliberate fire of heavy B.L. guns at extreme ranges. Should not each company fire say ten rounds of M.L. case and six or eight 9·2-inch or 10-inch B.L. shell at ranges over 8000 yards in its annual practice?

It may be added that small incandescent hand-lamps (with accumulators), are badly wanted for Fort Commander's station, position-finding cells, depression range-finding drum-readers, and dials and other kindred uses—fighting lanterns, and "lamps, tracing and signalling," are most inconvenient, and in windy weather unserviceable—incandescent lamps will come in for all fort purposes eventually, no doubt.

COAST DEFENCE IN RELATION TO WAR.

The first Lecture delivered at the Malta Naval and Military Society, 28th December, 1893.

BY

MAJOR SIR G. S. CLARKE, K.C.M.G., R.E.

MAJOR-GENERAL STUART NICHOLSON, R.A., IN THE CHAIR.

I HAVE thought it wisest in this first paper of our new Society to avoid all technicalities and to address myself only to principles, in which we can all alike find interest. Coast Defence may be treated from many different points of view, and that which I propose to take is, unfortunately, the rarest, for various reasons. An era of peace inevitably tends to make us forget the teaching of war, or to believe that it has no real value in presence of modern discoveries. Each fresh invention, from a quick-firing gun to a submarine boat, is invariably announced to the world as capable, if we will only adopt it in sufficient quantities, of revolutionising warfare. Yet the great principles of warfare by sea or land remain unchanged and unchangeable, as far as we can judge from the experience of the past, and we have no right or reason to believe that modern science will alter them.

Fortification perhaps suffers specially from the absence of the test of continuous experience, which powerfully operates in regulating the progress of the civil sciences. The products of the latter are healthy growths ever acquiring fresh strength and conquering new realms of action. Their entry into the science of men and nations is determined by the uncompromising laws of evolution, which ruthlessly reject all that is worthless or chimerical and ensure the survival of the fittest. They are in fact subjected to the severe test of every-day requirement, and they triumph or pass into oblivion, according to the measure of their practical achievement.

The science of fortification, if it can be rightly so styled, has not to pass through the same ordeal, and failing the application of the one possible test—war—it tends inevitably to drift into the airy regions of mere speculation. Fixed data, unquestioned deductions from real experience, are generally unattainable, and the human mind, craving certitude, readily invests its individual promptings with the sanctions of authority. Thus the very triumphs of scientific progress involve danger to fortification, since by an easy process of thought they appear to be universally applicable to the strange and special needs of war. The inventor, fired with the enthusiasm which is his necessary attribute, rarely grasps conditions which fall wholly outside of his experience, and reason shows pale in the dazzling light of the prestige justly attaching

to modern discovery. Principles are thus effectually obscured, and matters of secondary importance become the first objects of discussion, while policy drifts, or is allowed to be dragged, in the train of mere subordinate detail.

Coast Defence appears to be peculiarly liable to danger of this nature. It offers an enticing field to the clever scientist. Weapons of every class claim a part in its sphere, and the advocates of each are filled with conviction. Standing on the border, where sea and land meet, it has a dual aspect—naval and military—by which a confusion of ideas is apt to be engendered. Moreover, the war record of Coast Defences has been little studied, and is intimately bound up with those great lessons of naval history which are only now beginning to be rightly understood.

Under such conditions the instability of opinion, of which there have been notable examples, is easily explained.

In 1786 the apparent weakness of the defences of Portsmouth and Plymouth gave rise to a strong demand for a heavy expenditure on Coast fortification, supported by a powerful Prime Minister. This was a period between great wars and threatened invasions. The British Navy had not by any means asserted the supremacy subsequently attained, and had even been overweighted during the struggle with the American Colonies.

Nevertheless, it was naval opinion which secured the defeat of projects, to which Pitt lent all the weight of his great influence in Parliament. If ever Great Britain required Coast Defence on a large scale, this would appear to have been the period; but the experience of war seems to have led the minds of that day to the opposite conclusion.

By the year 1859, however, the great naval leaders had passed away. Lord St. Vincent, whose views prevailed in 1789, had been dead for 36 years, and the teaching of war was forgotten so completely that Lord Palmerston found a Royal Commission willing to recommend an expenditure of 11 millions on mere fixed defences. Conjecture during a long period of peace at sea—not necessity proved in war—thus sufficed to bring about a change in the policy of a nation, and to raise an artificial standard of requirement which has entailed consequences far reaching.

The standard and the popular ideas to-day are unquestionably based on the theorising of 1859—not on the wide experience of the French wars. France had inaugurated an era of Coast fortification. We, as frequently happens, thought it necessary to follow suit, without pausing to work out our problem in accordance with our own special conditions.

As illustrating what is, it is to be hoped, the zenith of the Coast Defence mania, I may point to the proposals of the United States' Board on Fortification which sat in 1885. This body demanded, in all seriousness, an expenditure of 5½ millions sterling for the local defence of a port so extremely fortunate in its geographical position as San Francisco.

The inevitable inference seems to be that first principles were wholly ignored, that the questions—how, by whom, from where, and with what object can this place be attacked?—never even suggested themselves.

Policy must have been relegated to experts, who, whether naval or military, are invaluable, so long as they are never permitted to have anything to do with it.

At a time when principles ceased to be derived from the experience of war, details naturally escaped from the same controlling influence, and the Coast Fortifications inaugurated in 1859, while freely reproducing defects previously admitted, failed in some conspicuous instances to profit from teaching so recent as that of Sebastopol.

I doubt whether any lesson could have been more clear than that afforded by the action of the Wasp and Telegraph batteries. It exactly corroborated experience gained in the French wars; it was emphatically enforced by General Todleben himself. Yet, in the rage for monumentalism which supervened, it remained almost unheeded. A reaction has happily occurred, and the coast battery is no longer copied, as nearly as possible, from the two or three decker, thus reproducing all the disadvantages inherent in the ship.

At the present time interest tends to fix itself on subsidiary questions, such as those of mines, torpedoes, guard-boats, electric-lights, and position-finders—all perhaps useful in their several spheres, but dangerously capable of making their advocates oblivious of principles. Each must be studied, but none affects general policy.

For Coast Defence cannot properly be regarded in the light of a direct contest between the ships and weapons employed on shore. Such contests have been relatively few and unimportant in the past, and will probably be even fewer and less important in the future. The ship is not, and never was, constructed with a view to them, and where, as in the case of the old bomb vessel of Nelson's day, or the armoured batteries used by the French at Kinburn, special craft have been called into play, the command of the sea was the first condition of their action. The function of the special craft was in fact a mere incident in the large operations of war.

Broader aspects of the questions must be regarded. We must look to history where principles, such as those so admirably deduced by Captain Mahan, will surely be found. The records of the attack and defence of fortified positions established on coast lines are sufficiently voluminous. What as a rule were the issues; how were those issues determined?

Early maritime warfare took the form of mere raids for plunder. The raider might, perhaps, be met and advantageously opposed on the beach; but Coast Defence in the modern sense was unknown, and the helpless population of a seaboard could provide itself with no specialised protection.

Probably the first step was a look-out station of some sort, from which an alarm could be given to enable the coast dwellers to hide their families and portable property. As the art of building advanced, the dwelling would be designed for purposes of defence, and by slow degrees would reach the stately proportions of Dover Castle. Specialised Coast Defences appear to date from the introduction of gunpowder, previous to which time the castle, whether on the coast or inland, would be practically the same. The one difference of conditions was that the

over-sea attack, such as the eastern shores of England were long exposed to, and as the sea-board of the Mediterranean suffered from to a much later date, would generally come as a stroke out of the blue.

The growth of sea-borne commerce, which in other ways has wonderfully moulded the destinies of the world, invested coast lines with supreme importance. There, at points favoured by nature, wealth and population quickly accumulated. There were built, fitted out, and assembled the war navies which sea-borne trade called into being. There, too, were definite objects of attack, and Coast Defence soon came to be regarded as a special branch of fortification. Navies, having become organised fighting bodies, were able to extend the sphere of their operations. The corsair, who lived by the plunder of commerce, could be attacked at home, and sought by artificial means to prolong his interesting existence. Thus, from early times fortified seaports were the centres from which "sea power" radiated. While, however, the possession of natural harbours is a necessary condition of maritime strength, their defences are wholly subordinate. Such defences are in themselves no source of sea power, to which they may, nevertheless, bring aid in limited measure. It was not by means of Coast Defences that Carthage and Rome won their position in the Mediterranean.

Out of the conflicts which were waged for the possession of points on the sea-board, I have selected the following, spread over a wide period, as typical; but my time will only permit a brief reference.

Natural advantages, geographical position, and a navy gave an importance to Syracuse which provoked the jealousy of Athens and led to the siege of 414 B.C. The sea front was unassailable, and the besieging force under Nicias and Alcibiades proceeded to wall in the defenders on the land side. The Athenian party within were urging surrender when a Corinthian ship arrived bearing the promise of naval aid. Three naval actions having taken place, resulting in the defeat of the Athenians, the siege was raised. It is remarkable that Nicias, in a letter quoted by Thucydides, seems to have fully grasped the fact that the success of his undertaking must be decided on the sea. Two hundred years later Syracuse, which had espoused the Carthagenian cause after Cannæ, was attacked by a Roman fleet and land force. Marcellus, commanding the former, was fully provided with all the appliances of the age; but, the naval attack being easily repulsed by the engines of Archimedes, the port was merely watched during the winter of 213–212 B.C. The Carthagenian relieving fleet, however, sailed away to Tarentum, not daring to meet the Romans, and the fate of Syracuse was sealed.

Rhodes, in 1480, was very indifferently fortified, but was held by the flower of the Knights of St. John under one of their greatest Grand Masters. The Turks, absolute masters of the sea, disembarked 70,000 men, with a formidable artillery, in the bay of Trianda, and a purely land siege was commenced, varied only by the employment of fireships by the besieged. After the failure, with heavy slaughter, of the great assault of the 27th July, the Turks withdrew. Again attacked in 1522, Rhodes fell after a six-months' land siege. The fortifications had been much strengthened, but the supply of powder proved inade-

quate to the extensive counter-mining operations, and no relief was forthcoming. On the day after the surrender a fresh Turkish fleet hove in sight.

The fortifications of Valletta in 1565 were of an elementary description—a small fort at St. Elmo point, the Castle of St. Angelo, a line across the peninsula, and some outlying defences at Senglea.

The Turks, about 30,000 strong, with a heavy artillery—60-prs., 80-prs., and one 160-pr.—landed on the 18th May in Marsascirocco and proceeded to besiege St. Elmo, which fell on the 23rd June, after one of the most brilliant resistances recorded in history. The quarantine harbour was thus opened to the besiegers, who were able thence to carry their galleys over into the grand harbour. The land siege of St. Angelo was then prosecuted and a boat attack attempted. Repeated assaults failed, but the resources of the defenders were nearly exhausted when, on the 24th August, a relieving fleet from Sicily arrived, and the siege was abandoned.

The fortification of Valletta subsequently received the enormous development we see every day. As has been well said, it became "the sole care of the Government," and "ended in being a matter of pure ostentation." Meanwhile, the fighting powers of the Knights of Malta unquestionably diminished in proportion to the supposed technical perfections of their fixed defences. Whether this decadence was the result of over-fortification or the over-fortification, the result of decadence need not be here considered. In any case, this tremendous fortress was surrendered to Napoleon in 1798 with hardly a show of resistance. No attempt was made to force the entrance of the harbours, and the French troops were landed at several points, subsequently converging upon the land front.

Immense efforts were made by France and Spain for the capture of Gibraltar at a period (1779) when Great Britain was at war with three leading naval Powers and with the American Colonies. The land siege was supported by a powerful fleet, and special vessels were employed in the attack of the sea front, which was nevertheless extraordinarily ineffective. With exceptional natural advantages on the land side, an able commander, and a fine garrison, the only danger was that of the exhaustion of supplies and ammunition. We have every right to be proud of this memorable defence; but it should never be forgotten that the success was rendered possible only by successive efforts made by the British Navy at a sacrifice of other objects of great—perhaps greater—importance.

At Sebastopol the issue turned upon a competition between sea and land transport, which, under the conditions of 1854, could not be doubtful. The fleets of Great Britain and France possessing absolute command, supplies and reinforcements for the land siege could be forwarded under peace conditions, while the Russians depended wholly upon long and almost impassable roads. When once Russia determined to stand at bay in the Crimea, the result was merely a question of time and of the persistence of the Allies. The coast defences, which were permanent, costly and considerable, played a wholly subordinate part. The land defences, which were almost entirely non-existent on the side

selected for attack, but were subsequently created by Todleben's genius, dictated the measure of the resistance.

Admiral Dupont's armour-clads made no impression on the defences of Charleston in the attack of the 7th April, 1863, and the action of 40 minutes ended in withdrawal with the loss of one vessel. Morris Island having been occupied by a military force, Fort Wagner fell to a regular siege on the 7th September, and Sumter, the one permanent defence of the harbour, was soon reduced to a ruin.

The island of Lissa, fought for on the sea and saved by British frigates in 1811, was comprehensively attacked by a powerful Italian fleet in 1866. The harbour of San Giorgio and the anchorages of Camissa and Manego were defended by miserable works, mounting 60-pr. smooth-bores and a few rifled 60-prs., to which Admiral Persano opposed four armour-clads, one monitor, eight partially armoured frigates, and 14 other vessels. The monitor and two of the armour-clads carried 300-pr. Armstrong guns, and the armament of the squadron in all respects was far superior to that of the Austrian defences. The attack of the 18th July was mainly directed against San Giorgio, and no result was obtained after a great expenditure of ammunition. On the following day a fresh attempt was made, the *Formidabile* entering the harbour only to be rendered *hors de combat*. At eight next morning the approach of Tegethof's squadron was signalled, and the action which followed secured the immunity of every Austrian port.

This series of notable attacks on fortified ports is spread over 2300 years. Gunpowder had replaced twisted sinews; the feeble artillery of the 15th and 16th centuries had developed into the relatively powerful armaments of 1866: the galley had grown into the three-decker, to be in turn superseded by the armour-clad steamer. Yet all the governing principles and the conditions by which the issues were determined remained practically unchanged.

Thus in every case, while the purely naval attack failed altogether, as at Syracuse, Gibraltar, Sebastopol and Lissa, or was not attempted, as at Rhodes and Malta, the fate of the fortified port depended absolutely upon sea power, actively asserted at Syracuse (414 B.C.), Gibraltar and Lissa, operating as a menace at Syracuse (212 B.C.) and Sebastopol. Fleets uniformly ineffective in the direct attack, whether equipped with the crude appliances of Marcellus, or the rifled 300-prs. of Persano, nevertheless dictated the issue. The success or failure of the defence turned upon purely naval considerations. Syracuse would have been saved if Bomilcar's squadron had been able to defeat or to overawe that of the Romans; Lissa must inevitably have fallen if the Italian navy had obtained command of the Adriatic. Again, the attack invariably took the form of a land siege, rendered possible only by naval transport, and the subordinate issue was decided precisely as in the case of an inland fortress, by the available resources, fighting power, and land front defences of the besieged.

The defenders of Rhodes in 1480 were able by sheer fighting capacity to inflict losses sufficient to cause the withdrawal of the besiegers; but the primary condition of real success being on the side of the Turks, the

fortress was nevertheless doomed to fall. Malta and Gibraltar were both saved by relieving fleets, while Syracuse fell to the Romans, because their squadron dominated the situation. This similarity cannot be the result of accident, and it points to a law which may be formulated as follows :—

Attacks on an enemy's fortified ports across the sea are generally undertaken for naval objects, are practicable only on condition of full naval superiority, and to be effective must assume the form of military operations on shore, supported by a covering naval force able to maintain communications.

These military operations on shore may, of course, and often, have been successfully carried out by sailors when their scale was comparatively small; but they may nevertheless be distinguished from the direct naval attack which specialised coast defences are intended to oppose.

Apparent exceptions to this law exist in such cases as Algiers (1816), Acre (1840), and Foochow (1884), where the object sought was attained by purely naval means. At Algiers, however, was concentrated all such power as was at the command of a semi-barbarous people. Acre held an Egyptian force practically hemmed in by a hostile Syrian population. The defences of Foochow were turned by a French squadron, which had lain inside them for weeks before declaring war—a proceeding possible only in the case of semi-civilised and unorganised Powers. Moreover, so ineffectual were the operations that a vessel was launched from the dockyard of Foochow within a short time of the bombardment. Conversely the fate of Acre, besieged by Napoleon in 1799, was decided by an insignificant British naval force operating securely after the battle of the Nile. Alexandria, in 1882, will at once occur to your minds as another exception; but defective gunnery on the part of the Egyptians goes far to explain the result. The heavy rifled guns, of which 33 were brought into action, had been rarely, if ever, used previously; but the practice made with the old smooth-bores, which were not even provided with sights, was remarkable.

The record of Coast Defences, broadly speaking, has been of a negative character. They have played a subordinate part in the history of war; but they may have operated as a deterrent against purely naval attack in cases when this form of proceeding might have been effective had they been absent. The extravagance to which they have given rise naturally creates a reaction, and extremists proclaim their general uselessness.

Coast Defence, however, when applied in accordance with strategic principles and rigidly kept within the limits of real requirements, can undoubtedly add to the security of a State. Upon these principles, and upon the just measure of these requirements turns the whole question of national advantage or national delusion. While the extent of the defences of Toulon to-day defies all rational justification, it is futile to argue that Toulon ought not to be fortified at all. We may perhaps lay down the following general rule:—"Coast Defences are required for ports containing resources necessary for the purposes of war or commerce, and their standard should be such as to effectually prevent an enemy from seriously injuring those resources by purely

naval action." This is delightfully vague, as a general rule should be, and it at once opens up the question as to what force an enemy could apply to the purpose—a question to which the answer depends entirely upon naval considerations. It will serve, however, to explain my contention that, if carried beyond a certain point, Coast Defences are of no use whatever. When once protection against purely naval attack has been provided, the issue will then depend upon the manner of resistance which can be made on shore. But the possible strength of naval attack will be determined by the power of your own navy, which also can alone prevent an enemy from bringing all his military resources to bear against you. The naval impotence of Russia, in 1854–5, rendered it possible for Great Britain and France to employ all their military resources against Sebastopol, and if the British Navy cannot hold its own in the Mediteranean, there is hardly any limit to the military force which could be brought to bear upon Malta, if the object to be gained was thought sufficiently important.

The changes arising under modern conditions, and the so-called revolution effected by modern armaments, are frequently referred to as pretexts for the extravagant standards of the day. Those changes are of minor importance in regard to the present question. No revolution in the relative power of attack and defence has ever occurred. The enormous development of sea-borne trade since the period of great naval wars, which ended in 1815, has made new demands upon fighting navies—not upon Coast Defence, which loses importance in proportion to the value of property at sea and to the national need of its continuous transit. The value of the sea-borne trade of the Empire in 1891 was upwards of £970,000,000. It is by the *movement* of that trade that we live, and if it were locked up in protected ports it might almost as well be captured or destroyed. Steam, replacing sail power, has rendered coal the first need of fleets; but naval bases were as necessary in Nelson's day as in our own. Their strategic importance remains unchanged, though their appliances and resources must now be different in kind and greater in extent. Naval operations in distant waters have always demanded secure harbours, which may now be required at more frequent intervals along a line of communications, but are not, therefore, intrinsically more valuable.

The free use of coal in distant seas will turn upon naval supremacy, and the navy which commands the sea will find little difficulty in securing its coal supply. Docks and refitting appliances, which cannot be transported across the world or extemporised, are essential to the free action of a navy whatever its strength.

Advances in armaments adding power both in attack and defence have not materially affected the balance between them. The ship was never capable of attacking a well placed and well designed coast battery on equal terms, as the engagements off Cape Licosa, in the Gulf of San Fiorenzo, and against the Wasp and Telegraph batteries at Sebastopol clearly prove. Increased range and accuracy of fire have not modified her disabilities, but have extended the zone within which she can be severely injured. The development of shell power involves far greater possibilities of injury to the ship than to the battery. In spite

of recent advances, armour, effective for a brief period, is overmatched, in the sense that invulnerability can be conferred only upon small portions of the target presented by a sea-going vessel. Steam enables selected positions to be taken up with certainty and promises the means of timely retreat, but does not materially alter actual fighing conditions. It appears clear, therefore, that while strategic considerations call for no increased application of Coast Defence, the ship in a contest with the shore battery now suffers from greater disabilities than at the beginning of the century. Squadrons or single ships, however, possess the unquestioned advantage that, when once equipped for sea, they can be immediately employed. In peace time they are organised and ready in a higher degree than any military force; at the outbreak of war they are in part distributed over the world and able to act at once. This peculiar readiness of the naval weapon points to its employment in the future as in the past, while speed and the certainty with which movement can now be timed will probably be turned to account in dealing unexpected blows. Where the operation falls within the limit of the potency of the naval weapon, as at Algiers (1816), Acre (1840), Sfax (1881), or in the chastisement of an African coast tribe, success will be attained. Where the task lies outside the sphere of purely naval action, there will be failure, either absolute, as at Santa Cruz (1797), Charleston (1863), Lissa (1866), Alicante (1873), Tamsui (1884); or comparative, as at Sebastopol (1854), Fort Fisher (1864–5), and Foochow (1884).

Thus the nature and standard of necessary Coast Defence depends upon the potency of the naval weapon; but the question is complicated by further considerations where each of the two combatants possesses a navy. In such a case, the superior naval power can devote to the purposes of coast attack only the balance after deducting force sufficient to deal effectively with its antagonist's navy on the high seas; while the weaker power can so operate only on condition of accepting grave initial risks, of an inevitable weakening of its already inadequate naval strength, and of abandoning the hope of more than temporary success. Here lies the explanation of the relatively unimportant part which Coast Defence, pure and simple, has always played in great wars, and of the extremely little need of its support which Great Britain has felt. Our many enemies were not in a position to undertake purely naval attacks, even at a time so apparently critical as that following the battle of Beachy Head, and when our naval abandonment of such waters as the Mediterranean occurred, those enemies naturally resorted to combined operations and attacked the back door. "Fortresses," wrote Napoleon to Soult, "are nothing in themselves when the enemy, having command of the sea, can collect as many shells and bullets as he pleases to crush them."

Conversely, our great naval leaders had a well-founded objection to committing their ships to doubtful operations which, even if successful, diminished their fighting value on their own element. Nelson's letters give us the views of the greatest of Admirals as to the disadvantage of the purely naval attack upon Coast Defences of so comparatively feeble as those of Bastia and Calvi. On the other hand, when it was

necessary to capture an enemy's fortified port, as in the striking case of Mauritius, we utilised naval superiority in the right way, and employed an expeditionary force which did not concern itself with Coast Defence.

Thus, throughout history ports were captured or saved, but the issue depended upon naval conditions, not on coast batteries. Instances might be multiplied almost indefinitely.

In 1756 the strongly fortified position of Port Mahon fell to a French expeditionary force solely because the squadron under La Galissonnière dominated the situation. Our unfortunate Admiral was shot for failing to save this much fortified port, and, as I think Admiral Colomb has pointed out, naval officers, judging from this incident, may possibly be tempted to doubt whether fortified harbours tend to mitigate their many responsibilities. Restored to Great Britain in 1763, Port Mahon was again taken by the French and Spaniards in 1782, the British Navy being then powerless in the Mediterranean. The naval situation having been restored, Port Mahon was re-occupied in 1798 by a British force without the loss of a man. Louisbourg, in 1745, provided with much coast defence and a regular garrison, fell in 49 days to the attack of a force mainly composed of New England volunteers. Restored to France by the treaty of Aix-la-Chapelle, Louisbourg was again captured in 1758. In these cases the immediate success as usual turned upon a land siege, but the issue was absolutely dictated by the naval situation, and this must always be the case of positions isolated by the sea from the parent State. Such positions lie at the mercy of the Power which establishes and maintains the command of the sea, and may not hope to find salvation in fixed defences.

The case of home ports differs only by reason of the resources laying behind them. They can be seriously attacked only by a Power which has established complete naval superiority. Their capture is equivalent to successful invasion. Thus, modern developments of military forces, together with roads, railways and telegraph communication, have changed the aspect of the defence of the home ports of all great Powers.

Operations, such as those which were successfully carried out against Cherbourg and attempted against Rochefort, are now possible only after the military forces of a nation have been crushed in the field. The back door in these cases is now guarded by the organised military resources of a nation, and these resources can be brought to bear upon the invader far more rapidly than formerly. Not only, therefore, does the inducement to attack such a port as Plymouth appear to be diminished, but the possession by an enemy of the necessary naval condition of success would imply that the object for which Plymouth exists had already practically disappeared. The enemy would have accomplished his main ends, and ignoring Coast Defences, could proceed to invade, or rest satisfied with the destruction of British commerce. Similarly, if the British Navy is driven out of the Mediterranean and unable to return in force, it is not clear that the loss of a single life in an attack on Malta would be justified. So long as the fleet was absent, Malta

could bring no aid to the Empire, and its future fate would be decided by the general issue of the war.

From what has been said I think it is evident that Coast Defence, using the word in the broadest sense, must be divided into two distinct elements, viz. :—

(1.) The means adopted to deny certain very limited waters to an enemy's vessels. This is Coast Defence in the ordinarily accepted meaning.

(2.) The resources—men, organisation, supplies, land fortification temporary or permanent—available to resist the attack of forces landed outside the zone of protected water.

This important distinction is rarely recognised, and while academic discussion naturally centres upon the first element, all history clearly shows that the measure of resistance of a fortified port usually depends upon the second. The one is in fact required only to oppose ships in their weakest capacity; the other may be confronted by the tremendous forces which sea power can bring into play. Neither may safely be neglected; but while an undue extension of the first adds no strength whatever, the inadequacy of the second may render the whole scheme of defence valueless.

Thus Coast Defence in the narrow sense demands merely that purely naval attack shall be rendered hazardous. If this condition is fulfilled, the attack is driven to fall back upon the method from which alone decisive results can be expected. If it is not fulfilled, results important, though restricted, can be attained by purely naval action.

Ports containing exposed resources required for the use of a navy in war, or necessary for the shelter of a mercantile marine, must, therefore, be provided with defence. The command of the sea cannot be established at the outset of a war between naval Powers, and even when established will not secure such ports against naval raids. If the naval raider is able to destroy docks and stores, and to sink or capture shipping, injury in proportion to the strategic importance of the port and the value of its exposed resources will be inflicted. While, therefore, the strong naval Power requires Coast Defences to avert the risk of losses which might hamper its action, the weaker naval Power may seek by their means to add to the difficulty of the task imposed upon an enemy. Even in this case, however, mere coast works will avail little, since the magnitude of the enemy's task will depend on the second element of defence.

The mutual interdependence of fleets and Coast Defences forms a fertile subject of a controversy tending inevitably to fall into a vicious circle. The modern theory that Coast Defences confer freedom upon fleets appears to be unsupported by the teaching of war. Fleets able to keep the seas cover the ports from which they act much as a field army covers its base, and require Coast Defences in their rear, as the bases of an army may need protection against cavalry raids.

I am afraid that you will all think that this paper is far too naval, and that you have been enticed here on false pretences. I will, there-

fore, attempt to raise a military analogy. If you had to guard an immense tract of country everywhere alike passable, and to which an enemy had access only at certain known points; if, further, it was vitally necessary that this whole area should be continuously traversed with no serious interruption by your own convoys, what means would you demand? You will say at once "a powerful mobile army, able to defeat the enemy if he comes out and offers battle, and to follow and defeat him if he succeeds in evading us." Would you make large demands on fortification? I think you will answer, "No, the powerful mobile army, *ex-hypothesi*, renders much fortification unnecessary, and if our convoys must continue in motion, they can rarely avail themselves of it." But if you have read the multifarious red-books with which you are supplied, I think you will hedge your answer by adding, "of course we must have light defences at the supply depôts of our field army and at the halting places of our convoys to guard against raids by small quickly moving bodies, such as the now fashionable mounted infantry."

The above conditions fairly represent those of the British Empire in war; but the analogy is imperfect, for fleets, however large, can concentrate, wheel, or countermarch with perfect ease, while a great field army would generally find any such movement difficult and sometimes impossible. This difficulty is illustrated with consummate skill by M. Zola in *La Dèbâcle*, and would have presented itself in the great right wheel of the German Army if it had not chanced that the supply trains were écheloned left in front.

Our newspapers have recently grasped the fact that naval supremacy is essential to the maintenance of the Empire and are never tired of repeating the formula; but none, even of the so-called service journals, understands all that it either entails upon ourselves or implies to our possible enemies. The maintenance of naval supremacy in certain waters means of necessity that large expeditions cannot traverse these waters without a certainty of being either intercepted, as was that of Conflans in 1759, or destroyed after reaching its destination, as was that of Napoleon in 1798. The risks are greater now than formerly, for the time required for the reduction of a fortified position has not been reduced, while the speed at which intelligence can be communicated and naval concentrations carried out has been immensely increased. It means that naval bases will receive protection of the most effective kind against all except raids. It means that the more remote the port from an enemy's base, the greater the difficulty and the risks of even a raid. It means that the defences of Melbourne and many other places are unnecessarily great and costly.

You will at once say, "but we have not got this supremacy, and if we are to believe some of our self-constituted teachers, we are at the present moment in a state of hopeless inferiority." I am not going to enter upon these burning questions to-day; but I assert positively that, if this supremacy is not forthcoming in war, no amount of Coast Defence will help us. If, therefore, it is really a question of cost, then let us spend every available farthing upon the navy and its immediate requirements. When the navy suffices—not till then—let us begin to

consider our fortifications. In the words of Lord Dundonald:—"There is no security equal to that which may be obtained by putting it out of the power of an enemy to execute hostile intentions." I do not believe, however, that we are unable to create and maintain an adequate navy as well as the extremely moderate defences which alone we need. I merely protest against the false notice that there is any sort of interchangeability between the two, or that fixed defences can ever enable us to dispense with a single sea-going ship.

My subject is a large one, and I have attempted only to deal with one aspect of it. The question of policy and the adoption of a true sense of scale should, I venture to think, come first. When these are settled, ring in the experts, and take particular care that they do not go back on every principle you have laid down. Designedly this paper has been made somewhat vague. I have not defined what strength is assigned to a naval raid, or laid down the measure of defence which I would provide in a given case. To do so would involve entering upon a variety of considerations foreign to my present purpose. The probable strength of what I have called a raid necessarily differs according to circumstances, political and geographical. The measure of necessary defence varies with the distance of a probable enemy's bases, and with local hydrographical conditions. Before either can be intelligently considered, it is, therefore, imperative to arrive at certain general conclusions, naval in their very essence.

The points which I have sought to emphasize may now be briefly summed:—

(1.) The strength which the attack can assume depends entirely upon the naval conditions. Defended ports will not be attacked by expeditionary forces, except by a Power in full command of the waters which give access to them. Given this command, there is little limit to the strength that may be brought to bear against them.

(2.) Protection to ports containing resources necessary to the naval action of a great naval Power is always desirable; but it must be remembered in such a case that the protected port is of no value except on account of what the navy may be able to do outside it. To provide extravagant defences and to starve the naval resources is, therefore, an imbecile policy. The first consideration is the sufficiency of the naval resources; the second, the defences. Similarly, protection is desirable for ports necessary to a mercantile marine in war; but, in the case of a Power which exists by commerce, this protection will not avail unless the sea approaches are guarded, which can be done only by a sea-going navy.

(3.) No practicable naval supremacy will ensure complete immunity from raids, which in the case of an enterprising enemy would be most probable at the outset of war. In such raids torpedo-boat attacks are obviously included where geographical conditions are favourable. While the

right policy appears to be a vigorous offensive at sea, against the torpedo-boat, it is evidently futile to provide heavy armaments and remain unprepared against what might now be by far the most probable form of attack.

(4.) The defence of a port always implies the fulfilment of two separate conditions—protection of necessary resources against purely naval attack, and protection against military operations on shore. There is a back door which, as history clearly shows, is the one usually selected; and, in closing this back door, Coast Defence proper, in spite of its many weapons, will generally render no assistance. But for the unique conditions of the land front of Gibraltar, the fortress would almost certainly have fallen.

(5.) Finally, the conditions of our national life are special and peculiar. We must fulfil their needs in our own way, and we cannot borrow a policy from the foreigner. Least of all, is it rational to reply to Coast Defence by Coast Defence as we have been sometimes invited to do, and as we actually did in 1859.

In conclusion, I will only add that it is a change of attitude in regard to fixed defences which I advocate. I am no fanatical enemy to fortification, but only to its ill-considered and irrational application. For fortification, if carried beyond its due limits, if made an end and not a means, seems in all history to be either a sign or a promoting agent of national decadence. In a fine passage Gibbon has illustrated this characteristic of the later Roman Empire:—

"The fortifications of Europe and Asia were multipled by Justinian; but the repetition of these timid and fruitless precautions exposes, to a philosophic eye, the debility of the Empire. From Belgrade to the Euxine, from the conflux of the Save to the mouth of the Danube, a chain of above four score fortified places extended along the banks of the great river . . . . . a strong fortress defended the ruins of Trajan's bridge, and several military stations affected to spread beyond the Danube the terror of the Roman name. But that name was divested of its terrors; the barbarians in their annual inroads passed and contemptuously re-passed before these futile bulwarks, and the inhabitants of the frontier, instead of reposing under the shadow of the general defence were compelled to guard, with incessant vigilance, their separate habitations . . . . . The Straits of Thermopylœ which seemed to protect, but which had so often betrayed the safety of Greece, were diligently strengthened. From the edge of the sea-shore, through the forests and valleys, and as far as the summits of the Thessalian mountains, a strong wall was continued which occupied every practicable entrance; granaries of corn and reservoirs of water even provided for the garrisons, and by a precaution that inspired the cowardice it foresaw, convenient fortresses were erected for their retreat."

I am not sure that some future Gibbon will not characterise, in like phrase, certain of the projects of the present age.

DISCUSSION.

Captain Wilson, V.C., R.N., said:—I think it my duty to rise to express the views of the whole meeting by thanking Sir George Clarke for his paper. (Cheers.) There is only one objection I have to make, and it is this: he has not left us a point open to criticism. (Hear, hear). If I am to criticise, I do not exactly see where to begin. (A laugh). As far as the Navy is concerned, we are all absolutely convinced that our trade—indeed, the existence and welfare of the Empire, depend on our being able to keep the control of the sea. (Hear, hear). But there is a possible danger of anybody carelessly listening to this lecture being led to think that fortifications are nowadays of very little use. Major Clarke has guarded himself against that statement, and I have paid particular attention to try and run him in. (Laughter). He has taken a very accurate view of the necessity of fortifications. There is no doubt that our position in the Mediterranean would be very much more useful if the French had not strongly fortified Toulon and converted it into a refuge for their ships; and, also, if they had not erected a line of fortifications along the Coast of Africa, which might make it difficult for our cruisers to bring their fleet into action and enable us to fight them. In the same way, on our side, we should be in a most difficult position in trying to defend the trade route to the East if we had not Malta to fall back upon to replenish our stores, to coal, etc. We cannot expect to be supreme always and everywhere. We have it on the authority of a Member of the House of Commons that if war breaks out the necessity might arise for us to withdraw, for a time, from the Mediterranean, to return afterwards. In that case, I think we should be very glad to find that Malta has not been taken from us in the meantime. (Hear, hear). I think that I really have nothing else to say; I agree so thoroughly with the lecturer that I am utterly unable to criticise him. (Cheers).

Captain Williams-Wynn, R.A., said that, in his opinion, Coast Fortification might prove a very valuable ally to the other element of Coast Defence. Sir George Clarke undoubtedly had been very guarded in his statements on this point; but it seemed to him (Captain Wynn) that the lecturer had made out the trade of the Garrison gunner to be as valuable, perhaps, as smoked glasses to look at an eclipse—(oh! oh! and laughter)—not very useful; wanted once or twice in a hundred years. (Renewed laughter). The moral of Sir George Clarke's lecture was that the best line of resistance for Coast Defence was not on the heights of the coast, but on the sea itself. The poet Campbell, it seemed, had had a due appreciation of the value of the sea power when he wrote—

> "Britannia needs no bulwarks,
> No towers along the steep."

But a later and perverse generation had, nevertheless, sunk a good deal of capital on "towers along the steep!" In the text-book of Fortification which was in use at Woolwich when he (Captain Wynn) was there, the question of fortresses was summed up as follows:—

"Fortresses, therefore, if placed and properly used, increase the force available to meet the enemy in the open field."

This referred to inland fortresses; but was it not also applicable to Coast Fortresses as well? It would appear that fortifications existed only for, and on account of, the Navy, and it appeared more logical to hand them over the entire management of the first element of Coast Defence, or to constitute a special Defence Corps under Naval Administration. At present the Navy, the Artillery, and the Submarine Mining branches all work on their own lines, and if he (Captain Wynn) should suggest that he should be acquainted with the number and nature of the submarine mines which were within range of the guns of the

fort he was to fight, he should be told that such information was strictly confidential. (Loud laughter). In his opinion the representatives of each branch of Coast Defence would work much better if each knew what the other was doing, and why he was doing it. In support of his contention he would quote Lord Brassey who, in 1889, had said :—

"It must be accepted as a leading principle that the defence of harbours should be secured by forts and not by ships. The Royal Navy is not maintained for the purpose of affording direct local protection to sea-going ports and harbours, but for the purpose of blockading the ports of an enemy, of destroying his trade, attacking his possessions, dealing with his ships at sea, and preventing an attack upon any special place."

This seemed at variance with the principles laid down by the lecturer. The second element of coast defence required concentration and organisation, which was not difficult where good railways were available. After dilating at some length on the usefulness of horse artillery, Captain Wynn said :—A landing in force would certainly not be attempted unless the attacker was absolute master of the sea, and even then the undertaking was serious. He instanced the case of Lissa, when it took five hours to make preparations to land 2200 men, and even then the attempt was frustrated by the arrival of the Austrian Fleet! If a landing in force required too much preliminary arrangement to find the defender unprepared, there was another class of landing which was both probable and dangerous, he alluded to the landing of small parties to destroy the shore ends of cables or to wreck position-finding stations. A handful of men could, in most cases, soon capture or kill the operators—the C.R.A. and his staff, in addition, probably—(loud laughter)—and a few hand charges would wreck several thousand pounds worth of instruments in five minutes. As to submarine cables, he believed that a row boat would be able, under cover of night, to slip along the shore and cut them before being detected. The protection against this class of attack would be infantry picquets with double sentries, and the knowledge of their being there would surely prevent such attempts being made. (Loud applause.)

Captain Acland, R.N., who was indistinctly heard at the reporter's table, was understood to say that he wished to ask the lecturer whether, in his opinion, it was worth while, in the event of a war, for instance, with France and Russia, to defend such a place as Malta, or to leave the place alone. He believed that if the British Fleet were driven out of the Mediterranean, even for a time, the moral effect would be felt all over the world. (Hear, hear). He was of opinion that our naval stations should be made absolutely secure against foreign attack during an occasional absence of the fleet. (Hear, hear). He also wished to know whether the lecturer was not of opinion that our large mercantile towns should be adequately protected against an enemy exacting a heavy ransom by threatening a bombardment. (Hear, hear).

Colonel Clayton, R.A., desired to make a remark in reply to Captain Wynn, who seemed to think that Sir George Clarke was opposed to fortified ports. Sir George had carefully guarded himself against committing himself to any such opinion, and had, in fact, expressely mentioned certain ports and places, the fortification of which was extremely desirable. (Hear, hear). He (Col. Clayton) also believed that the same opinion answered Captain Acland's question with regard to the protection and fortification of mercantile ports. Personally, he agreed thoroughly with the principles laid down by Sir George Clarke; but it appeared to him that the real difficulty would arise when the time came to adopt the general principles to particular concrete instances. (Hear, hear).

Sir George Clarke, in reply to the criticisms made on his lecture, said that Captain Wynn had, in an amusing way, taken objection to what had been said

respecting the usefulness of Garrison Artillery, but he (Sir George Clarke) maintained that nothing in his lecture denied the fact that the Garrison gunner was an invaluable person. (A laugh). Sir George had had a little correspondence with his critic on this point, and he was sure he had convinced him. The Garrison gunner was, in his opinion, most necessary in Coast Defence as a deterrent; his usefulness was like that of a notice that "a fierce dog was on the premises." (A laugh). That fierce dog was the Garrison gunner. (Loud laughter). We might want one or two, but we did not inevitably require a whole pack. (Renewed laughter). With respect to Captain Acland's question, the lecturer did not see why the Mediterranean fleet should be withdrawn. He could only think of two causes which might make such a step necessary; a withdrawal, with a view to concentration, to come back in force afterwards, or a defeat. In both cases, however, a naval attack on Malta seemed extremely improbable. (Hear, hear). Such a step, taken after the withdrawal of the fleet, would be extremely dangerous; while, after a great naval battle, an enemy would hardly be in a position at once to risk ships in an attack on Coast Defences. (Hear, hear). With regard to commercial ports, the great point was to keep them open in war and make their vitals secure against bombardment by an enemy's cruisers. Fortunately some of the great commercial towns of the United Kingdom were so favoured by Nature that an enemy—our inferior at sea—would run risks too great in attempting to attack them.

EXTRACTS

FROM THE

DIARY OF LIEUTENANT F. W. STUBBS, BENGAL ARTILLERY, IN 1857-1858.

BY

MAJOR-GENERAL F. W. STUBBS, *late* R.A.

November 26th, 1856.—Ferozepore. Got an answer from Johnson in answer to mine declining the Recruit Adjutancy, telling me that my name had gone up to head-quarters and it would be best not to refuse it; and that everything I had formerly asked for was to be granted.[1] So go I must, I suppose. I hear W. Olpherts is to command the depôt when he comes out.

December 11th.—General orders in. Woodcock comes to 3rd Company 6th Battalion, and H. A. Olpherts goes to 1st Troop, 1st Brigade, Horse Artillery. I am appointed to the depôt as soon as relieved by Angelo.

January 11th, 1857.—Got to Meerut.

March 19th.—The recruits under Moir arrived. A young-looking set of men, but Moir reports favourably of them. There are 360 of them, besides 100 native recruits already here.

April 24th.—The 3rd Cavalry here turned out against the cartridges. Feeling is very wide spread; it has spread up to Umballa, where a man of the 9th Lancers was stabbed while sleeping on his cot at night, it is supposed by one of the malcontents.

May 9th.—We paraded early this morning to hear the sentence on the Jemadar of the 34th Native Infantry read out, and also to witness the execution of the sentence on the 85 troopers of the 3rd Light Cavalry; 10 years' hard labour for 80, five years' for the rest. Tombs' Troop and Scott's Battery went with loaded wagons, the Rifles with balled cartridge, we having only blank ammunition and the swords of the Horse Artillerymen. Ironing the 85 took a long time, after which they were marched down the line and off to the gaol, looking wicked.

[1] In 1855, when Adjutant of the Artillery Recruit Depôt at Meerut, I had pointed out the impossibility of undertaking the responsibility of 12 pieces of ordnance, arms for 400 men, and clothing, without any establishment whatever; or of drilling the men properly without any assistance. Claiming also the ordinary pay of an adjutant. But the Mutiny broke out, and neither establishment nor pay came to me.

Some of the sepoys stepped out of the ranks and picked up boots, &c., which the prisoners threw to them. Felt relieved when it was over. At mess the same evening was astonished to see the officer of the 60th who had commanded the escort to the gaol. He told me his orders were to make them over and return. Went to a civilian there and asked him if there were any extra guard? He told me that 40 more Barkandáz (police) had been entertained a few days ago. Two young officers Lieutenants Ryan and O'Brien arrived from England and joined the Depôt.

Sunday, May 10th.—Two more young officers Lieutenants Hume and Knox reported their arrival to-day. Was driving Mrs. Garstin[1] to evening service when Salt[2] met us and told us the Native Infantry regiments and cavalry were in open mutiny and shooting their officers. Left her there at Lieut.-Colonel Hogge's[3] house and went back for her children, but when I got to Hogge's they were driving out of the compound and told me to take them on to our lines to Major Scott's; they following. At the Brigadier's compound, the sepoy guard were lining the wall and firing at the passers-by, so I had to make a bolt of it and got past. A couple of cavalry sowárs with drawn swords came up behind the buggy a few yards further on. Fortunately they had taken too much bhang; could not see straight. Asked where their Colonel[4] was. (He had just galloped on). Could only say to the first, looking him in the face, "*Jahannam ko jáo,*" and they went. The little girl,[5] eight years old, behaved splendidly. She kept her little brother quiet all that night at Scott's, Hogge's carriage having turned back. Left them there and went down to the barracks. Light[6] came to me and said we were to disarm the different sepoy guards in our lines. (Had only blank ammunition). Took 20 men, the rear rank were Horse Artillerymen, who had swords. The first guard, of a Naik and four privates, were discreet and surrendered their arms. With these we went to the School of Instruction, where was a native officers' guard (24 privates, some N.-C.O.'s), sending back five carbines. Light joined us, and we confronted this guard, which was ordered to surrender. They brought their muskets to the charge, and one of the bayonets, which were fixed, caught Light in the collar, whereupon the front rank fired and five sepoys fell, the rest dropped their arms and bolted.

The rest of the guards were easily disarmed. Every pouch was filled with balled ammunition. Scott and Tombs, with some of the 60th Rifles and Carabiniers, went down to the other end of the station. Light went to find the Brigadier. Posted picquets of recruits along our lines. The whole night we were kept on the alert by constant

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[1] Wife of Captain H. M. Garstin, Officiating Assistant-Adjutant-General, not joined.

[2] Adjutant 3rd Battalion Artillery.

[3] Artillery. House beyond our lines. Lieut.-Colonel Hogge was Director of the Depôt of Instruction.

[4] G. C. Smyth, commanding 3rd Light Cavalry.

[5] Now the wife of J. S. S. Harvey, Esq., M.D.

[6] Commanding Artillery Recruit Depôt.

fires, and reports of all kinds, of murders, &c., came up. In returning from one of my patrols came across Brigadier Wilson, but he did not speak to me. Found my bungalow, next Scott's, burning. My khidmutgar and bearer had taken in Dr. Christie, who had been left for dead on the road outside (the Veterinary-Surgeon with him was killed), and secured doors and windows, so they set fire to the thatch.

The young officers of the Depôt came to the orderly-room, which I made my head-quarters. Jervoise, Webster, and the Quartermaster-Sergeant of the 3rd Cavalry came up to our lines, having had narrow escapes. They said the Native Infantry and some of the cavalry had gone in the direction of Delhi. They remained in the Depôt Orderly-room all night.

May 11th.—About 9 o'clock the troops were sent to their barracks, and we spent the day at the orderly-room making arrangements for the night, arming the recruits with muskets and balled ammunition, which was not quite finished to-day. The fires in the native lines continued, and by the evening most of the bungalows were destroyed. The number of casualties uncertain. We had three recruits killed in the bazaar, and 12 wounded. A native recruit shot near the 3rd Company barracks by mistake. McNabb, Dawson, Phillips, and Mrs. Dawson, 3rd Cavalry, killed; Colonel Finnis, MacDonald, Taylor, and others of the Native Infantry killed. Our picquets run from the Carabinier lines round the European Infantry and Artillery as far as Hogge's bungalow.

May 12th.—My head-quarters during the night were at the orderly-room. My horses picketed at my head and saddled to patrol with the recruit reserve all round the artillery lines. The recruits very wild sometimes, much inclined to fire at you first and then call out, "Who comes there?" Alarms at night too frequent.

Aislabie came in from Delhi with Farrier-Sergeant Law reporting the murder of nearly all the European inhabitants there. The troops stood to their arms as the villagers in front of barracks were making demonstrations. Willoughby blew up the magazine, but nearly all the powder was in the new one near cantonments. We were all quite dispirited on receipt of this news; not for ourselves, but for our friends. Scott's stables were fired to-night. Patrolled round them, but could find nothing. The bodies of those who were murdered the first night were buried this afternoon.

May 13th.—Light is posted at the 3rd Company 3rd Battalion barracks. He has a strong picquet of 60 men and two guns there; two guns on picquet in front of the staff barracks, and two more at the end of the wall near the Brigadier's house. The latter I look after. The Brigadier, the General, and staff with a number of the Native Infantry officers have taken up their quarters in "the staff barrack" (*i.e.*, for the Horse Artillery Brigade Staff N.-C.O.'s). More officers in the next barrack. Would not exchange their cots and atmosphere for my bedding on the ground in front of our orderly-room. Patrolled twice during the night all round at 12 and 4 o'clock; sent the subalterns and Native Infantry officers posted to the Depôt round at intermediate

hours. Stupid and useless alarms somewhat frequent,[1] but I deposited all our bugles and trumpets in the orderly-room to prevent the young recruits beginning them. We were allowed to come from the orderly-room during the day into the cooler staff barrack. The ladies are stowed away in the Depôt of Instruction buildings.

May 14th.—The man who murdered Mrs. Chambers (Lieutenant C., 11th Native Infantry) was brought in this morning by Möller of the 11th. The Native Infantry officers asked General Hewitt to try him at once, but the General declined, saying he was not under military jurisdiction. They got into a state of excitement, it seemed likely to spread, so I told my Sergeant-Major to get together some of the steadiest N.-C.O.'s and men and keep them near at hand.[2] Lieutenant Chambers, coming into the barracks, went into hysterics; revolvers and swords were taken out. Hewitt sent for Colonel Harriott, Judge Advocate, who said that martial law should be proclaimed in cantonments and civil district, if civil law were powerless. Mr. Greathed was sent for, and said he had already reported the civil law powerless. So martial law was proclaimed outside the barracks, to the wondering amusement of the men, and a few minutes after Harriott and some five officers were seated at a table trying the case.

Shortly afterwards, I was sent down to the suddur bazaar (main one) and lower end of cantonments, with a troop of Carabiniers under Bruce, to hunt for seven of Scott's men, who went down there armed for the express purpose of getting up a row—blood or loot, they said—but they had returned before we got there. Nothing done during the night.

May 15th.—Heard from Umballa that the 9th Lancers and H.M. 75th are ordered down. The sappers from Rurkhi, 558 strong, came in to-day under Captain E. Fraser. They have taken several of our night picquets off our hands. Heard from Delhi that the sepoys have been plundering the city, and the King has made Jamma Bakht his successor, to which the elder son objects; consequently there is a split. Wounded men in hospital getting on well.

May 16th.—After tiffin we were startled by a report that Captain Fraser had been shot by his own men. It turned out but too true. All out in a few minutes, and the picquets at their posts. Heard that the mutineers had gone across the parade in the direction of the sand-

[1] On one occasion the alarm was "Look out there, the enemy (!) are coming down on the right." Stopping it proceeding further, I went down the line of sentries till I got to Lieutenant Light's picquet, where it turned out that two young privates of the Carabiniers on vedette, got their horse's tails together with the usual result. "Look out there, where the —— are you driving to," being wrathfully vociferated, passed down the line, "*viresque acquirebat eundo.*" A night after Lieutenant Pemberton's picquet sounded an alarm. The report was that a body of men were in front, but the sentries could only hear them. Telling them to turn in, and that it was probably some cattle moving about, I rode down the range and came, sure enough, on an old Bráhmani bull lowing and pawing the ground. Coming back at a sharp trot, both recruit sentries fired at me when about 40 yards off. My language certainly was not parliamentary, but the trumpets next day were lodged in safer keeping. It must be recollected that the recruits were very raw ones.

[2] In explanation of this, I should say that Major Tombs and Major Scott were in their own barracks. I was commanding on the spot those who would have to act in a sudden emergency, and throughout was left almost without orders. But I never saw men so near mutiny as the Native Infantry officers were just then.

hills on the right. Tombs' troop, with a squadron of Carabiniers, went after them and came up with about 50 of them, who posted themselves behind walls and in holes, and might have done much damage had they only fired straight. One Carabinier killed; two wounded. T. P. Smith a scratch, and Hogge a ball through his leg, not dangerous.

Two companies of the Sappers were on duty in cantonments and not in camp this morning when Fraser was shot. They were at once marched up to the two-gun picquet in front of our barracks. Two Horse Artillery guns and a company of Rifles were sent for, and Lieutenant Maunsell, of the Engineers, formed the Sappers up in front of us. The General rode up and briefly addressed them, saying their arms must be given up, but that he hoped that they would remain loyal and get them back. They laid down their arms; the Rifles and Horse Artillery guns departed, but as each Sapper had besides his musket, two tulwars, Maunsell agreed with me that these also should be taken from them, only he wished to have the General's sanction for it. He began removing them, while I rode after the General and told him. He at once said, "Yes, quite right," but Waterfield (Assistant-Adjutant-General) coming up said, "No; most injudicious;" and both forthwith fell upon me, dismissing me at last with orders not to take away the tulwars. Back I went, marvelling much, but when I got to the spot the carts with all the weapons had gone off. Had a quiet night.

May 17th.—Information in that some of the Delhi officers are at Khekara, about 29 miles from here. A party of cavalry went out to bring them in. Another went to Sirdhana and brought in the nuns from the convent.

May 18th.—W. Wilson (Lieutenant of the Delhi Field Battery) came in to-day. The party sent out have brought in Lieutenant Forrest (who assisted Willoughby in defending the magazine), his wife and daughters, and several other officers.

May 22nd.—A force has been told off to march on Delhi, under Brigadier Wilson; 100 of the recruits accompany it. Light commands them; a great disappointment. Spoke to Johnson about it; but it seems I must remain here.

May 26th.—The Delhi force, consisting of two squadrons Carabiniers, two divisions of Tombs' Troop, Scott's Battery, 100 Artillery recruits, a wing of the 60th Rifles, and the two companies of the Sappers and Miners marched this night.

No further entries in the diary till November. Went over to Delhi on the 2nd of that month for a week to settle estates of about 60 of the recruits, who had been killed or died during the siege.

December 3rd.—Applied officially for an exchange into the Horse Artillery, for which my name had been put down in 1854. On the 6th received command of the Recruit Depôt from Captain Light, which I had virtually exercised since the 13th of May.

January 15th, 1858.—Sir Archdale Wilson ordered to join the Commander-in-Chief, with Colonel C. Hogge and Major E. B. Johnson, A.-A.-G.-A. Wrote to the latter to have me sent with the force for Lucknow. Went to the first-mentioned and requested leave to resign

the Depôt command. He made some reference to my eyes, which did not appear relevant to the matter in question.

But three weeks after found my name in orders as posted to the 4th Troop, 2nd Brigade, Horse Artillery, at Rawal Pindi, commanded by one of our best officers, Major C. V. Cox. To join when relieved of the Depôt command.

March 6th.—Wrote to the Colonel (Kinleside, Commanding Artillery, Meerut) to ask for command of the four heavy guns coming in with the 4th Company, 4th Battalion, to join the column about to be formed at Rurkhi. Order issued.[1]

March 7th, Sunday.—The movable column starts to-morrow. Hammond's Battery (3rd Company, 3rd Battalion) goes with it, and Cadell, with Girardot, go with its heavy guns (2nd Company, 4th Battalion).

March 8th.—The 4th Company, 4th Battalion, and heavy guns, under E. Fraser, came in this morning. He returns to Delhi; E. T. Hume goes on. Busy making out the Depôt accounts to hand over to Cliff. Bought his pony.[2]

[1] I afterwards found that Lieutenant Affleck Fraser, 3rd Troop 1st Brigade Horse Artillery, had been previously nominated.

[2] Had been Quartermaster-Sergeant, 3rd Brigade, Horse Artillery. Promoted Ensign for good service at Delhi. He had been ordered to take over the office.

My horses and all my traps had gone to Rawal Pindi. Had nothing but one change of raiment. This pony had a holy horror of elephants.

March 9th.—Hume marched for Daurála. Joined him at Khatauli next day. To Muzafarnagar on the 11th, where I reported myself to Brigadier Coke's staff officer. Made the last three marches (35 miles) in two days, reaching Rurkhi, March 13th.

Ordnance, two 18-prs. and two 8-in. howitzers; 400 rounds per gun. Have only 34 men, the company having left half its number at Govindgarh, and not replaced casualties during the siege of Delhi.

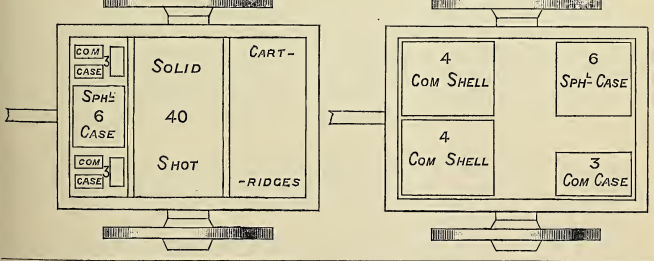
March 15th.—Coke inspected guns, elephants, and bullocks. He thought most of the cattle in very poor condition, which is the case.

Next day had a conversation with him about crossing the Ganges, which promises to be a serious operation. The road from the Ganges to Najibabád was chiefly through a forest jungle, 23 miles about, and there is a probability of being attacked there. Penny, commanding the Meerut Movable Column, has, he says, got permission to act on his own discretion, so he may walk into Rohilkhand first and leave us little to do. Coke's Rifles, 17th Punjab Infantry (Major Larkins), and Captain Cureton's Multani Horse are the only troops here as yet. Cureton (38th Native Infantry) is son of the fine cavalry officer, 3rd Dragoons, killed at Ramnagar nine years ago.

March 17th–27th.—Indented for various stores, carts, &c., required to complete. The whole of the ammunition being in hackeries, some kind of ammunition wagon must be devised. Drilling and exercising cattle. The Ganges canal is capital for a swim, and many of the men, as well as we, use it. When I was here before it was for the opening ceremony of the canal in March—April, 1854, with two guns of Sissmore's Battery, and that scoundrel Muhamad Bakht Khán[1] Subadar, was with me. How I have longed to be within a sword's length of him!

March 28th, Sunday.—Austen (Major A. G.) came in with the 1st Company, 1st Battalion, and No. 7 Field Battery this morning from Umballa; Subalterns J. C. G. Price and A. J. Wake. The 1st Battalion 60th Rifles are coming up, and Colonel J. Jones is to command the column. Very glad; for there are few regiments like the 60th.

April 1st–6th.—Cookes wants me to exchange with him into the 3rd Troop, 2nd Brigade (Bourchier's), but declined; prefer the 4th Troop (C. V. Cox's). Made four carts into ammunition wagons, removing



[1] Bakht Khán led the mutiny at Bareilly. Coming to Delhi he had much influence with the King, who made him General.

the sides and placing a good edging of cheer wood. One cart for both guns carried 52 rounds; three carried 51 for the howitzers, which must do for the present. Austen had charge of some heavy guns in the Sikh Campaign of 1845, and his suggestions were useful. Some mortars and carts are coming up.

April 7th.—Weather is waxing hot; four men in hospital, three with fever. Went on an elephant to Manglaur. Smyth's Troop (5th Troop, 1st Brigade), only four guns, is there with Renny and Maynard, a squadron of Carabiniers, and Hughes'[1] Punjab Cavalry. They are encamped under trees, cooler than we are; a specimen of glorious irregularity, corps, animals, tents mixed up.

April 9th.—Four mortars and a detachment of the 4th Battalion coming up, applied for another officer. The rest of the Rifles leaving Meerut. We are to cross into Rohilkhand, and go on to Morádabád. Trying to get stores out of the workshops here. They supplied me with good bolts for ammunition carts, but planking and rope are scarce.

April 13th–14th.—R. R. Franks came in with two 8-inch, two 5½-inch mortars, and 34 men of the 1st and 3rd Companies, 4th Battalion, under orders to return himself at once. Got an order here to keep him. Spent the forenoon copying out plan and elevations of Pathargarh, a fort near Najibabád, which it is supposed will hold out.

Went to bathe as usual in the afternoon, when an order came for me to start at half-past 9 o'clock this evening, and join Smyth's camp, which had moved to Mirzapur. (It had gone on to Nágal, about 25 miles from here). Hanna,[2] one of the College students, comes out with me as a volunteer; a bright, intelligent young fellow, who will be of use. Grant, of the 1st Sikh Infantry, with two companies, is the escort. Marched at half-past 10 o'clock, but had to halt for two hours on the further side of Manglaur, as the carts and one gun had gone straight on towards Meerut instead of turning to the left at the village. Hume and Franks lost their way in the dark, but came up soon after. Day was nearly breaking when we went on. Got to Gobindpur at 11 o'clock, and the men's breakfast sent on was ready for us near Mirzapur. Rested under some trees, and started again at half-past 4 o'clock, reaching the "Chota Ganga" just after sunset. Two heavier branches of the river had been crossed, and we were not so far from the camp at Nágal. The stream was not more than two feet deep, but very sandy, with a high sandy bank on the other side, preventing a straight pull across. The first gun had just got over when it stuck, and before two more elephants could be traced in, the off-wheels had settled deep in the sand. Worked at it till midnight without success, and, both men and cattle being pretty well done up, sent them all to sleep.

April 15th, Thursday.—Up at day-break. Put 11 pairs of bullocks (which pull much more evenly than elephants), with elephants and drag-

[1] Now General Sir W. T. Hughes, K.C.B.

[2] Received an Ensign's commission, January 4th, 1860, for gallant conduct at Nagina. Brigadier J. Coke recommended him, and both Major Cureton and I had the pleasure of supporting the recommendation. He is now a Colonel on the retired list of the Bengal Army.

ropes on the wheels, and, notwithstanding the length of the team and high opposing bank, got it out so quickly that the sudden turn nearly upset it. The other gun and howitzers were got over without any difficulty, but it took a long time getting all the carts and hackeries across. Got to camp about 11 o'clock.

April 16th.—The rebels have a camp across the Ganges on the high bank bordering the Kadir land, and some rifle pits in the sand near the river. They have boats moored on their side under the pits. Have been saddled with temporary charge of the Engineer's park, also with the permanent one of Austen and Smyth's reserve ammunition.

April 17th.—Two Horse Artillery guns under Renny went to the bank and fired a few shell across at the rebels. The pits seemed empty. Hanna and I went down to try and capture the two boats, but just as we had begun to undress a fire was opened from the rifle pits, which were full of them, and only about 150 yards distant. So we had to put on our boots again and retire ingloriously, making short rushes towards them, which disturbed their aim, much to the amusement of Renny and the others above on the bank. He might have helped a brother sub. with a round shot or two. We only got laughed at.

At half-past 2 o'clock heard that the rebels had evacuated their camp. There had been firing heard in the direction of Asafgarh, and we knew Brigadier Jones was engaged there. Some of us went across with a company of Sikhs and some of Hughes' horse. Brought back two small tents, a *shamiána,*[1] and some iron, both acceptable. Captain Hughes brought from Jones' camp an order for me to march and cross the river higher up to join him. I represented to Smyth that a night march and crossing the river (which, though not too deep for guns, is so for carts) in the dark would be rather risky, so he wrote to say he would bring me on next morning.

April 18th, Sunday.—Started at half-past 2 a.m. A troop of Carabiniers, then my guns and platform wagons; then Renny with two Horse Artillery guns; lastly, a troop of Hughes' men under Fairlie. Had bullocks in; progress was slow. Gunner Dixon, in passing through high grass jungle, stumbled and fell under the wheel of an 18-pr., which passed across his back obliquely. Found him in great pain, but the apothecary of the Carabiniers failed to find a bone broken; got him into a dooly.[2] Got to Asafgarhghát at half-past 6 o'clock. Not a boat there; stream very rapid at the junction of a branch. The rest went on ahead and left me behind with all the sick. Got the guns across, and tried to make up rafts with the platform planks, but the wood being very heavy would hold nothing above water.

About 2 p.m. a company of Rifles, under Magill, arrived from Shishamghat in five boats, with Thomason of the Engineers. We set to work at once and got more than half the carts over by 11 p.m. Tents all gone on. Dougall and a company of the 17th came from Bágwáli

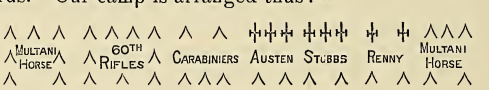
[1] A canopy supported by four poles. Useful to keep off sun.

[2] He recovered, wonderful to say; but had to be invalided and sent home. The thick clumps of root from which the grass springs saved him.

as escort, so I directed Magill to go on with the sick to-morrow. Have quite enough to do to take care of the stores. Dougall says the action yesterday was a feeble one on the part of the rebels. The Multani horse charged well, and took four guns; the Rifles got another.

April 19th.—Magill took on the sick; Gunner Dixon better. Got all the hackeries over. Heat appalling, reflected from sand and stones; the captured tents very useful. Started about 5.30 p.m. The road lay through forest jungle. Most of the villages deserted, but stray Bághis might have been lurking about after Saturday's fight. The detachment of 20 of the Punjab Cavalry were in front, Dougall and his infantry in front of the guns, leaving 20 men as rear-guard. Got to Bágwáli at 10 p.m.

April 20th.—Got to Najibabád at 8.30 o'clock, and was taken by a Sergeant, sent by the Quartermaster-General, through the town, but having got in and unable to turn in the narrow streets found the further half of it on fire. Sent back Franks and Hume to stop all carts that could be got round. One was found standing over a mass of smouldering straw. Some of the drivers were looking on contently, others had gone into the houses looking for plunder. But they caught it afterwards. Our camp is arranged thus:—



April 21st.—Marched for Nagina this morning at 4 o'clock; distance 13 miles. My guns came last of all, so did not leave the ground till near day-break. Austen borrowed Franks for this day, as we were kept in the rear. After going nearly 12 miles heard firing ahead. Coming up with all the speed we could get out of the elephants and bullocks, we saw the advanced-guard and Coke's Rifles engaged near the town of Nagina. Passed through a tope left of the road, passed several bodies, and one or two guns, but could not overtake those in front. Heard a report that we were wanted, and pushed forward to where the firing was heaviest. As we advanced saw Bott with his troop of Carabiniers charge down on some guns. He took ground to the left when near: each section of threes kept dressing beautifully; the guns opened and they fronted and went in at them. Could not help giving a cheer. Allowed Hanna to ride on ahead. Got up at last to where the Sikh Brigade and Carabiniers were drawn up outside a walled garden filled with men, and as we found afterwards, women and children. Austen sent some shells in, and Coke's Rifles stormed the gate. For half-an-hour we heard shots, and knew that not many would escape Coke's men.

I had nothing to do, so sat down and lighted a pipe. Doolies conveying the wounded were coming up and deposited close by. In one was the body of Gostling of Cureton's Multani Cavalry, shot in a

charge. In another I was looking at a dusty, blood-stained figure that seemed familiar. Suddenly the pipe dropped from my lips, "By Jove; its Hanna," and sure it was. He had gone on with Cureton, joined in a charge, was surrounded, got a severe sabre cut on the right thigh, while another assailant put a fire-lock to his stomach and apparently shot him right through. Dr. Jackson, of Coke's Rifles, examined the wounds, took out the ball, and thought the symptoms favourable. Gostling was shot through the heart in the same charge. Cureton, always in the front, followed up the rebels. Went into the garden. Outside were 69 bodies in one place, inside many more; also crowds of women and children. Of them one woman had been killed fighting in the gate; another had a leg broken by a stray shot; and under a shrub I found a young girl, with a child in her arms, both killed by one shrapnel.[1] Secured the captured guns, 12 in number, besides three *zamburaks*. The enemy's loss said to be about 600. When camp was pitched got Hanna into our tent. Jackson sewed up and dressed his wounds, which he bore splendidly.

April 22nd.—Marched to Dhámpur, nearly 10 miles; a large town. A pretty wide street for a country town, paved with brick. Rebels fled so far we encamped here. Captured a gun in a foundry here, and demolished the latter. A young telegraph signaller, who had been taken at Kankal two or three months ago, was recaptured yesterday. He said the rebels were some 12,000 strong, but were taken by surprise yesterday and all were not present.

April 23rd.—To Nurpur, another large town, about 14 miles. Several nullahs to cross, one river had steep banks, through which a steep slope was cut and the guns slid down, wheels locked, and 20 men on each drag-rope. Enemy reported to be bolting. Did not get in till 11 o'clock. Very hot.

April 24th.—Main body of rebels said to be at Morádabád. Marched 18 miles towards Amroha, but they had left that place. The slaughter at Nagina has produced an impression. Nevertheless there are lots of Musalmán Mufsids about here. The Hindoos turn out of the villages and make saláms to the sahibs, but very deep reverences to the big guns, as they pass. Had made all arrangements for the expected encounter to-morrow and laid down to sleep, when some of Coke's Rifles came in with a report of the enemy. In less than 10 minutes every regiment was under arms, and was marching out of camp. I went down with Franks and Hume, changed elephant for bullock draft, set 16 rounds per howitzer with fuzes, and had started for the objective point five minutes after the others, when the cavalry scouts returned and told us that the rebel picquets, which were close and had turned out, had walked off to Morádabád as soon as they saw us advancing. John Jones complimented us in orders on the promptness with which the force got under arms.

April 25th, Sunday.—Marched at 3 a.m. My howitzers in centre of

[1] I have detailed these—the only casualties among women—for, four years after passing near Nagina, I was told that our troops had massacred a large number of helpless women and children in 1858, and the Civil Magistrate believed it! Considering what the 1st Punjab Rifles were, it is marvellous that some were not purposely killed.

the infantry column, Hume coming after with guns, mortars, and powder carts. Reaching outskirts of cantonments found the enemy had bolted. Yesterday the Nawáb of Rampur had a fight with the rebels and was worsted. We halted on the roadside, and in about an hour his brother came in and made his salám to the Brigadier, after which we went on and encamped on the race-course. Coke's Rifles, two of Austen's guns, a party of Sappers, with some Multani Horse went into the city in quest of the man who had set up as Nawáb. He was discovered almost accidentally by young Angelo of Coke's regiment, who very pluckily shot three men in an adjoining room and seized him. The men named by Cracroft Wilson as to be marked down were captured and, I believe, shot this evening.

April 26th.—Got some smiths and carpenters from the city and proceeded with some necessary repairs. May halt here a day or two. Heard of Walpole's reverse at a fort in the Farukabad district. He lost a good many men of his own regiment (42nd Highlanders), and Colonel Adrian Hope.

April 28th.—More stores in. Two spare siege carriages, two ammunition wagons, round shot, &c.; 12 of the 47 bullocks completely unfit for work, rest not much better. A wing of Gordon's Sikhs, some Multani Horse, and Price with two 9-pounders went out at 2 o'clock towards Amroha to watch some rebels collected there, Major Gordon, Commanding.

April 29th.—Got two letters from dear old Day,[1] dated 14th and 25th February.

May 1st.—Completed the repairs of all my carts and fitted up the spare ammunition wagons. No news from the chief, but a report of a small force of Europeans having been attacked at Arrah by Koer Singh and defeated, with the loss of their guns.

May 2nd.—Got a palki for Hanna. The evening's dak brought an order to march to-morrow to Rampur.

May 3rd, Monday.—Marched at one; in the centre of the column. Took an hour to cross the Rámganga; the sand being very heavy and requiring elephants as well as bullocks, consequently the head of the column got far on in advance. A very heavy road and a troublesome stream close to camp, about two miles west of the city. Ghurras of water were placed here and there on the side of the road by order of the Nawáb.

May 4th.—Marched at 2 a.m.; encamped after doing about 11 instead of 14 miles, as the rebels have entrenched themselves at Mirganj, a few miles ahead; reported to be about 3000, with four to seven guns. The name of the village is Damora Kamora. Just as we were going to dinner, Bird, of the Carabiniers, came to my tent with the news that poor old Penny had been killed. He had gone on with cavalry and artillery, intending to surprise the enemy, and was 3½ miles a-head of his infantry, but was surprised himself. He must have been

[1] Major-General E. F. Day, Artillery, with whom I had corresponded since his retirement in 1855.

alone, or nearly so, as his body was not recovered for some hours. Forster and Betty, of the Carabiniers, wounded.

May 5th.—Marched at 2 a.m., in front of the infantry and behind Austen's guns. When we reached a tuft of trees, near Mirganj, where the enemy were reported to be, 3000 to 5000 strong with their guns, we here halted, and the Brigadier called up all the C.O.'s and gave them their orders. I was to proceed ahead, supported by a squadron of the Multani Cavalry and a company of the 60th, and form up when I thought myself within range, only in the road; Austen to send four guns to the right, two to the left; Coke's Rifles, 17th Punjab Infantry, and rest of the Multani Cavalry to the left; 60th, 1st Sikhs, and Pathan Horse,[1] to the right. We went on, the heavies leading at such a pace that Coke came and blew me up for tiring out the infantry. The enemy fled as we advanced, but the Afghan horse under Smith came up with them between Mirganj and the river, and captured three guns. So we reached the river, about 14 miles from last camp. It was pretty deep in some places, and it was necessary to prevent camels, &c., which were coming up, from disturbing the bottom till my guns had got over. Standing in the river, with a blazing sun overhead, keeping the ford clear with lungs and right arm was exhausting work, and I was done up when we got into camp, but went with Tedlie (60th—D.-A.-Q.-M.-G.) on an elephant to the river and had a bathe.

May 6th, Thursday.—Marched at 3 a.m. for Bareilly, which we heard was evacuated, the Commander-in-Chief having polished off Khán Bahádur Kháu in a fight yesterday; but on coming close to the city it was evident this was not the case; so after a few orders I went about 300 yards to the right with a gun and howitzer, leaving Franks with the other two to sweep the road. We fired half-a-dozen shots and then, limbering up, advanced to a bridge leading directly into the city, which I was ordered to hold. The 60th Rifles and Austen's guns had gone on, and when I came up to the bridge found two pieces, a brass 6¼-pounder and an iron zamburak, which were hooked on behind. Had a Mahout wounded. Bodies of the rebels are dispersed in different parts of the city. The 60th Rifles got some distance in, and cavalry went as far as the Kotwáli, but all were recalled except the 17th Punjab Infantry under Larkins, which was posted in that building. The Commander-in-Chief is at the other side, and after we had been working away for some time we heard him opening fire. We, however, have been in the city before him, which is something. Were under orders to be ready at a moment's notice during the night. There was a good deal of firing during the early part of it.

May 7th.—Got up very seedy with fever, could not go to the chief's camp. Our Rurkhi force is broken up, and Brigadier Jones goes on to Shahjahánpur in command of the force detailed below:—

2 Squadrons Carabiniers.
Multani Cavalry (Cureton).
No. 7 Field Battery (Austen).
Heavy Guns (Stubbs).
60th Rifles, 1st Battalion.

[1] Commanded by Captain F. H. Smith. Had just joined us.

79th Highlanders, detachment.
82nd Regiment, one wing.
22nd Punjab Infantry.
No. 2 Company Sappers.

The other wing of the 82nd is at Shahjahánpur, where the Mulvi is investing them. Coke remains with his Sikh Brigade. We are, most of us, sorry to lose him. I am! and so ought Jones to be. Brind was in the city, shelling and mining rebels out of it. Franks is to join the other camp and return to Meerut. Hanna takes the opportunity and goes with him; so I am left with only one sub. again, but a very good one. Was put in orders for the (honorary) post of Deputy Commissary of Ordnance to the Brigade which is termed "The Shahjahánpur Field Force."

May 8th, Saturday.—Marched at 2.30 a.m. to Faridpur, about 11 miles from the chief's camp. Had to go round the city, part of which is on fire, which added considerably to the length of the march. A severe dust-storm in the evening, with thunder, was followed by torrents of rain, and the tents got completely soaked. Our march tomorrow was countermanded. The heat is very great, but Austen's men do not seem to suffer from it; neither do mine; but the infantry lost, to-day and during the night, six men from the effects of the sun on the march, though we were in camp in good time. [1]

[1] As I cannot be tried for it now, and have not the fear of Lord Clyde hanging over me, I may confess my sins. When the sun got hot I made the men pack their tunics on the limbers and wagons, for which purpose straps were provided. They marched, and worked the heavies, in shirt sleeves; and when there was work to do in the field double rations of tea (for which Government did not pay, nor the men) were provided, and we had "dúd walis" (not camel-men!) who supplied the men with refreshing draughts of milk. The husbands herded the cows, their wives carried the milk vessels on their heads into action, and the gunners took care that they should be well looked after and respected. With only 67 N.-C.O.'s and men, I could not afford to have any in hospital.

(To be continued).

NOTES ON PLACES OF MILITARY INTEREST IN THE UNITED STATES.

BY

CAPTAIN J. F. MANIFOLD, R.A.

Having recently returned from a visit to the United States, where, through the courtesy of American officers I was able to see something of their army, I thought, perhaps, it might be an advantage to brother officers to mention one or two places of military interest, which can be reached and seen without difficulty from the principal cities which are likely to be visited by anyone travelling in America.

To see something of the New York garrison, Governor's Island and Fort Hamilton should be visited (at the latter the Field Artillery is quartered). Fort Hamilton is on Long Island, to reach it one of the many ferry-boats should be taken to South Brooklyn, whence an electric railway conveys passengers to the fort. Ferries start every half-hour and the railway runs in connection with the ferry, the time required for the whole journey being about three-quarters of an-hour.

The barracks of the field battery are entered through the fort, the officers' quarters are close by, and the mere fact of any English officer calling on the Commandant will ensure his being received with all civility and being shewn everything of military interest in the place. Mounted parades are generally held at eight o'clock, directly after the men's breakfasts, so that anyone wishing to see the batteries at work should not be later than this hour. The barrack-rooms, kitchens, and all arrangements connected with the interior economy of the men are excellent, and may be studied with much advantage. The stables are good, and the harness, especially as concerns pole-draught and slight peculiarities of material, should be carefully examined.

The stamp of horses to be found all through the States is most suitable for military purposes, those which I saw with the battery at Fort Hamilton, being particularly so; the purchasing of the remounts for this battery had been left entirely in the hands of the Battery Commanding Officer and had been mostly bought from New York dealers, averaging from £36 to £38 each—a very high price to give in the States; these horses are, however, of an exceptionally good stamp, and few batteries in any army are better horsed, than the one at present at Fort Hamilton.

West Point is easily reached from New York, either by train or by one of the Hudson River Steamers. The latter route is the most comfortable, but where time is of importance, train should be taken. The

river steamers are most luxuriously fitted, and the scenery is very fine all the way. The College buildings, including the cadets' rooms, studies and dining-hall should be seen; the hall is a fine room with a very handsome timber ceiling, and the walls are hung with portraits of American officers, educated at West Point, who died during the war of 1862–65. Sunday is, perhaps, the most suitable day for a visit, as the Church Parade affords a certain opportunity of seeing all the cadets together. Divine Service is held in the Chapel of the Academy, the prayers and form of worship being almost identical with those of the Church of England. The cadets full dress looks extremely neat, it consists of a bluish coloured coatee, of a pattern of George the Third's period, a white linen collar being allowed to appear above the coat collar, as with our serge jackets. The behaviour of the cadets in Chapel, their smartness when falling in on the conclusion of service and other small details, shew at a glance the very strict discipline which is maintained at the Academy.

The Chapel contains some very interesting monuments, but to see British Regimental Colours hanging on its walls as trophies captured from English troops during the American War of Independence, is indeed a shock to an Englishman. Besides the Academy itself, the old earthworks and the fort are of much interest. West Point was held by the rebel army as their most important post on the Hudson, as it always represented a base for action against New York. The old fort is now used as the cadets drill battery; and on the ramparts, directly overlooking the Hudson, has been erected a monument to Koscuisko the Pole, who, before devoting himself to the cause of his countrymen, served as Chief Engineer of Washington's Army.

Anyone staying in Washington should not fail to go to Fort Myer. This post, as it is termed in the phraseology of the United States Army, is about four miles from the city, and as a cavalry station is the second in importance in the States. The electric railway can be taken as far as the bridge crossing the Potomac, and from there a wagonette can be hired to the Fort. All matters of interest will be shewn, but, if possible, the men should be seen in the riding school. This building is one of the finest of its kind, being about 350 feet long by 120 wide, in fact it becomes a winter drill-hall and in wet weather is always used as such.

The United States Cavalry present a very different appearance from what we look for in a smart cavalry service; there is a complete absence of any outward form of smartness, but at riding and all kinds of equitation work, the men are very good; the riding bare-back and without reins is unsurpassed in any army, while the leaping of a high bar under the same conditions is a severe test of the training through which the men have passed. The horses are all thoroughly schooled, out of forty horses from a troop which was in the riding school at the time of my visit, every horse, but one, lay down on a given signal and remained perfectly quiet on the ground till the signal to rise was given by the officer in charge of the ride. There is much to be seen in the stables and general management of the horses, and a great deal of practical knowledge is to be gained from the peculiarities of the saddlery and equipment.

Fort Myer is situated on the main ridge of the Arlington Heights and on the same site as one of the principal detached forts which formed the main line of McClellan's defence of Washington, while within a few hundred yards of the barracks is the Arlington National Cemetery, in which many of those who served and died in the war of 1862–65 have been buried. Sheridan's grave is here and many thousands lie around him, their tombs marked by small headstones. All remains of the dead were brought here at the end of the war from the various battle-fields, and it says a great deal for the respect with which a nation has treated its soldiers and for the general administration of the army, that it should have been possible to have thus registered and marked the graves of so many private soldiers who, in the first instance, had been hurriedly buried where they fell. With the exception of those who were killed in the fighting round Richmond, most have been given a separate grave, marked by a neat headstone, while the remains of those killed at Richmond, have, for want of registration at the time of the original burial, been buried in large vaults, the slabs over which record the fact that in some cases, from 2000 to 3000 soldiers, whose memories deserve the respect and gratitude of their country, lie buried beneath.

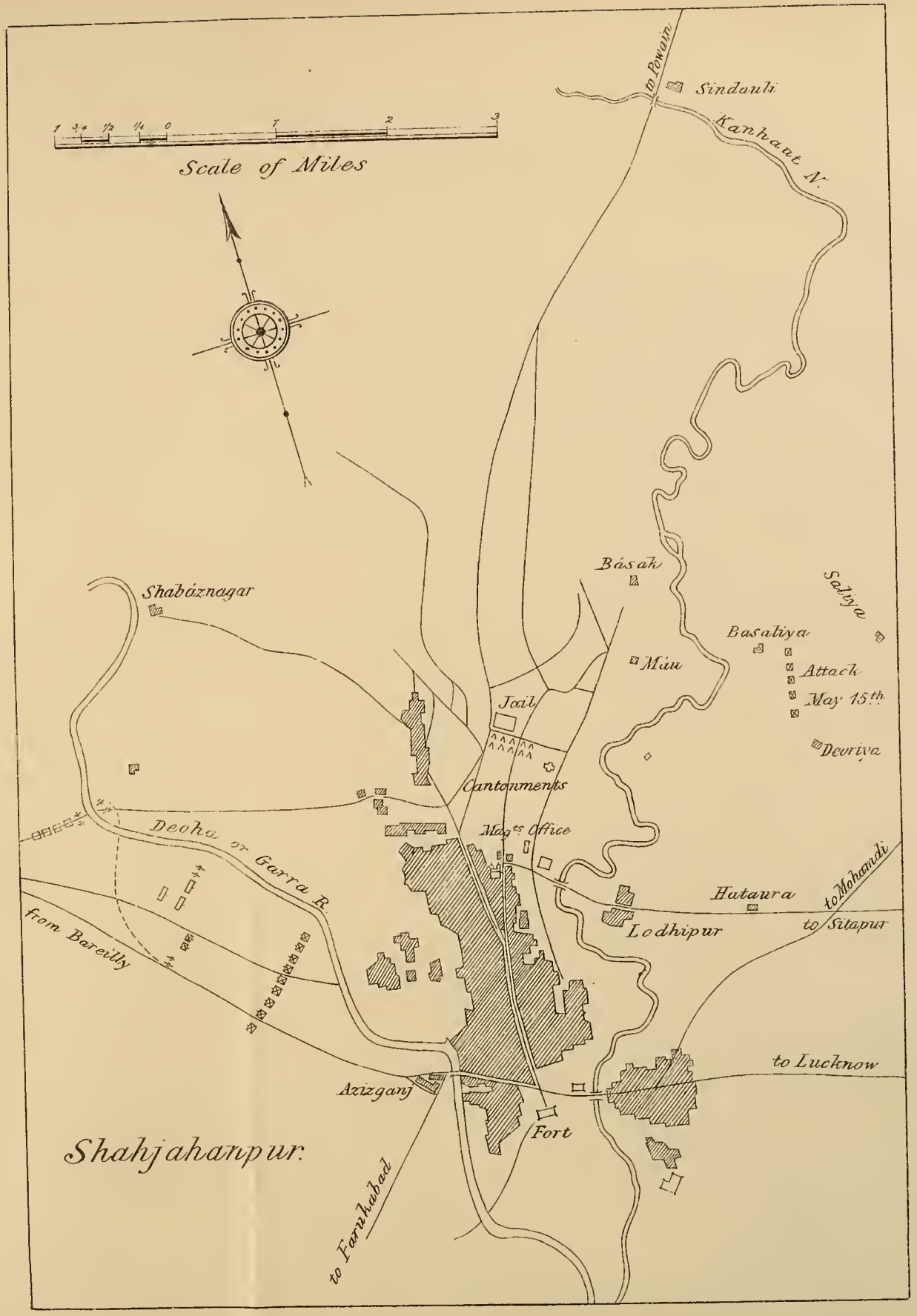
It is a strange fact that the family mansion of General Lee, the Commander-in-Chief of the Southern Army, stands in the ground which has now become the National Cemetery, while close to the house are the graves of General Sheridan and of other of Lee's keenest opponents. All of this portion of the Arlington Heights was included in General Lee's property, and was in consequence confiscated at the time of the war, though eventually on the land being taken up as a National Cemetery, some compensation was given to the heirs of the estate.

Bull Run is easily reached from Washington. The best way to see both battle-fields is to take the early train to Manassas Junction. There it may be possible to hire a wagonette or some kind of conveyance, but this is doubtful; under any circumstances, however, much more of the country could be seen when travelling on foot than from a carriage. Starting from Manassas, the road leading westwards to Henry House should be taken, it is impossible to mistake the way, as with the exception of a few small bye lanes running towards Blackburn's Ferry and other points on the Bull Run River, this is the only main road towards the west. Henry House may be taken as the most central spot on the battle-field, it is six miles from Manassas, and the road connecting the two places is that by which the largest portion of the troops marched to the first and second battles. Should the season be wet, the soft mud into which one sinks well above the ankles, will give a slight idea of the difficulties, under which both armies and still more so their baggage, moved.

Some of the hardest fighting of the American War took place around Henry Hill; a road leads direct thence to Sudley Springs, where the right of the Northern Army crossed the Bull Run River, in their attempt to prevent the junction of the Southern forces. There is also a cross-country road which can be taken to Gainsville, where the line

running through Thoroughfare Gap to Manassas Junction is reached, and an afternoon train may be taken which will bring one back to Washington by dinner time. A clear idea is thus gained of the railway, which played such an important part in the result of both the first and second battles. The distance covered in making this circuit is about fifteen miles, but it can be managed in one day, as trains run conveniently.

Anyone wishing to make a complete study of the Bull Run battles, had better, before visiting the actual scenes of the fighting, read the accounts of those battles published in the *North American Review*; a concise and accurate history of both battles, and the strategy which lead up to them, will also be found in *The Campaigns in Virginia, 1861–62*, by Dr. Miller Maguire. The country in the vicinity of Bull Run has undergone but little change during the last thirty years, except in the renewal of the forests, which, during the American War, were much cut down not only for defensive purposes but also to supply fuel to the many thousands of soldiers from both armies who were continually quartered in this neighbourhood. Much of the timber then destroyed has now re-grown, although the trees are greatly stunted from their original size and the undergrowth has become so dense as to be practically impenetrable for military operations.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to Mohandi
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Lodhipur
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to Lucknow
Azizganj
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to Farukhabad

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EXTRACTS

FROM THE

DIARY OF LIEUTENANT F. W. STUBBS, BENGAL ARTILLERY, IN 1857-1858.

BY

MAJOR-GENERAL F. W. STUBBS, *late* R.A.

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(Continued from No. 11, Vol. XXI).

May 10th.—Marched from Faridpur yesterday afternoon at 4.30. Road very good; one or two rather narrow bridges upon it, but no obstructions for heavy guns. After 10 or 11 miles, halted for five hours, then went on about the same distance to Tilahr, passing through Miránpurkatra. Got in between 7 and 8 o'clock this morning. Large village, lots of Hindus, Brahmins predominating. Several fortified gardens.

May 11th.—Marched at 2 a.m.; got near Shahjahánpur at an early hour, and left the road on our right, intending to cross the Garra river high up and advance direct on the enemy's position near the gaol. The advanced-guard crossed; Austen's guns followed, but found the sands very dangerous: one whole team went down to knees and hocks. It was wholly impassable for the heavies which followed, and I went down the river on an elephant to get a better place, when the enemy's cavalry shewed in large numbers moving towards our right and rear. Jones at once formed front to that side: Cureton advanced on our right flank to watch them: the Rifles on the left and 79th next, in front line; my guns on the left of the Rifles and nearest the river; the 22nd in second line. The General directed me to come into action when I thought we were near enough, so I went on to 1200 yards,[1] by which time the flashing of their sabres made them a good mark. Before that the General was getting a little uneasy, and sent three messages beginning, he had better, ending he must, come into action. Perhaps he thought we meant to try Norman Ramsay's dodge at Fuentes, but the "byles," though in good condition, couldn't do it. However, he came galloping down and then we unlimbered. The first shell at 1200 yards, followed by another, made them melt away like mist before the sun. Austen had extricated his guns in a wonderfully short time, came up on the

[1] Fuzes were tied up in bundles, labelled 1200 to 800 yards for common, 1000 to 500 for shrapnel shell; some for longer ranges, but 1200 was the best to begin on with these smooth-bores.

right, and went on while we again formed battery to the front and left; the latter to shell the town. Another advance brought us to the bridge over the river at the southern end of the town, where I was ordered to bring the howitzers and mortars into action to shell the town. Did so for a couple of hours, and got through a good deal of my ammunition. About 2 p.m. two companies of the 79th went into the town, so we got some rest and shade, both much wanted. The enemy's force seemed to be chiefly in cavalry, plenty of whom were not far off. Some men kept potting at us from houses across the river, behind thatched roofs, but the place was not prepared for defence.

Later in the afternoon the infantry, Carabiniers, and Austen's guns went on through the town and, as we were left quite alone, I packed up my goods and followed until we got to a tope clear of the town where the General was, and he gave me a tremendous blowing up for moving without orders.[1] Shortly after we moved on through cantonments to the parade-ground near the gaol, where the wing of the 82nd had been besieged for eight days; they were short of food. The artillery are a detail of my old Ferozepore Company (4–6), under Lieutenant H. O. Hitchins. The Rifles and 79th suffered severely from the sun (about 40 deaths I hear), but I think they had nothing to eat, whereas Austen and I had our mens' breakfast cooked while the shelling was going on, and though they had a greater share of exposure to the sun than the former, only one of Austen's men went into hospital in the evening; none of mine.[2]

May 12th.—Arranging our camp. Getting uncomfortably hot, but nights still cool. Hume sent down to the city with two 9-prs. of Hitchins', who has got three days' leave, leaving me subalternless.

May 13th.—Went down to look over the city with Wake and Girardot, of Austen's battery.

May 14th.—Went down with H. A. Brownlow of the Engineers, who is inspecting the defences, and looked at the fort, which is surrounded by many buildings capable of holding Europeans. Enemy are reported to be making arrangements to attack our camp in rear to-morrow after they had said their prayers.[3] We were called to the General's tent and got our orders along with a cheroot and a glass of brandy and water. The Avenger's cigars are always good.

May 15th.—Moved out and took up our position to the rear of camp at 2 a.m. As soon as it was light a gun and howitzer were sent to a tope of trees opposite a village on our left (Mau); the other two pieces about 400 yards nearer the centre. Our position extended along the road which went past the church and Magistrate's office and fronted towards the Khanaut river. A picquet occupied a fortified garden near the latter building and guarded the bridge on the Sitapur road, which passed through the village of Lodhipur. Half a company of the Rifles and half of De Kantzow's Horse were with the two left heavy pieces;

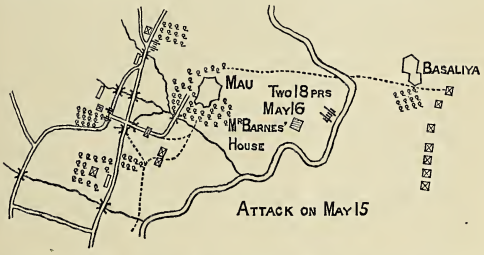
[1] After this I got from Major Cureton a couple of mounted orderlies to enable me to communicate with others.

[2] Our men not having rifles and ammunition to carry, had that in their favour.

[3] It was customary among the Muhammedan's to attack after one of the times of prayer, which they observed very regularly.

the 79th and half of De Kantzow's Horse were with the other two. The rest of the Rifles and 82nd, except those occupying the gaol and camp-ground, were still further to the right. My two right guns being somewhat screened by the trees round the village on their left front—were moved more to the right—and looked down part of a road leading to that village. As there seemed to be a possibility of the rebel cavalry coming through these trees unseen by us, I asked the General if he would occupy the village by a picquet, which he said he would do. But they were withdrawn, if ever sent there.

Having no subaltern, I went to the left guns, which seemed to flank the others; but, about half-past 10 o'clock, the enemy were reported opposite our centre, and I returned to the latter. Their cavalry were seen in great numbers on a sandy ridge, behind which were many more. Opened at 2300 yards, and they began to part right and left, finally disappearing. Kept up fire some time longer. Then the left



guns were heard a little time afterwards. They opened at 1600 and 1200 yards, doing considerable execution. I got on an elephant and went towards them, but had not gone far when I heard a man shouting after me that the cavalry were charging the guns. Shouted back "grape," and coming up as fast as the old háthi could go, saw the howitzer let drive, but though the elevation was too great (there was not time to depress it sufficiently), it had its effect. More than 200 of them had got up to a bridge about 70 yards off, but only some 30 crossed it. Got off the elephant and ran up just as Gunner Bremner (No. 5 at the gun) fired. He had waited till they were within 15 yards of him, on account of the elevation, and the effect was to empty several saddles and turn the rest about, except three, one of whom had a spike in his hand. Just then De Kantzow rode up with an old Sikh Native officer and one man (the rest had bolted); he used his revolver, but was severely wounded in the face. His résaldár cut the sowar down, and he fell over the trail of the gun. The other two turned and fled. We loaded again with grape and gave them a couple of rounds, but they got away clear of our front as hard as they could. I was well satisfied with the coolness and steadiness of the men. The credit was all their own.[1] Our cavalry played their gallant leader false; but had he not

[1] Yet the General in his despatch dismisses it with two lines—"charged on our guns with considerable loss to themselves, but none to us." G.O.C.C., 5th June, 1858.

come up just then, the three who did come in might have done damage, none of us had anything but handspikes or clubbed carbines to use, my orderly having taken my sword when I mounted the elephant.

I was also well satisfied with the practice of both detachments. The enemy suffered heavily. One of the Multanies told me to-day there were lots of dead horses on the ridge but not many bodies, as they had carried them away.[1] Austen's left-half battery was on the left, the right-half saved that flank and the town from attack, after the heavies had dislodged them from the ridge. Austen told me that more than a thousand horsemen had collected about the ford near Lodhipur, but scuttled when his guns opened. Cureton and the Carabiniers went after them. After this we saw no more of them; were ordered to bivouac on the ground we occupied.

Sunday, May 16th.—Went back to camp this morning, but while we were at breakfast, Austen's grass-cutters reported some sowars on the east side of cantonments, so I had to go out with two 18-prs. and take up a position at a salient bend of the nullah with a good view of the plain beyond, guarding the nullah for a mile on either side. Captain Bowles, 60th, with two companies in a half-ruined bungalow close by. Relieved by Hume in the evening, he having been relieved by Hitchins.

May 17th.—Ordered to be under arms at 3.30 a.m. this morning. Price, of Austen's battery, went down to the fort with my two 8-inch howitzers, and I moved into the position I occupied on Saturday with my 18-prs., the Highlanders, and a company of the 82nd. Recalled into camp in the afternoon. Scouts report 5000 or 6000 cavalry, with six guns. They kept carefully out of our sight, but were seen from the 18-pr. battery. Commander-in-Chief comes in to-morrow.

May 18th.—Suburbs beyond the lower bridge reported full of Mufsids. The Commander-in-Chief came in this morning. Tombs, with his Troop (2–1) Horse Artillery; Major Le Mesurier, R.A., with his Company[2] and a Heavy Battery, but I did not see them. The fort opposite the 18-pr. picquet was seen crowded. Had to waste a lot of good ammunition on them, for they were much too far,[3] though we could see them plainly: one figure careering on a white horse, said to be Firoz Shah. Was ordered down to Lodhipur with a 24-pr. and 8-inch howitzer. Got there just after sunset. Lord Clyde there: the enemy in numbers out in front; they had knocked over a horse of Austen's, and some of his and Tombs' men wounded.

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[1] Major Cureton told me afterwards that the people of the two villages near (Saliya and Deoriya) were employed with charpoys to carry away the wounded and dead. A curious instance of Pathán feeling to an enemy occurred here. The body of the man lying across the trail had been pushed on one side while we were firing. A number of Multanies who had been sent to us were standing or sitting holding their horses close by. Suddenly the "dead" man sat up. He had a severe sabre cut in the face across the jaw, but the tongue was able to articulate. He first addressed the Multanies, and by his gestures and eyes was plainly abusing them. They laughed as if it was a good joke. He then turned to the gunners, giving them a salute, and to me a deep salám. Then, taking up some earth he sprinkled himself (a symbolical ablution allowed when water is not procurable) and began the Musalmán *kalima* (profession of faith), "*la Allah, illa Allah,*" the only part of his articulation intelligible. Suddenly the Pathán laughter changed to fury. Out flew their swords, and the *kalima* never was finished.

[2] 3–14, R.A.

[3] At the village of Barnai, on the Mohamdi road, distant 3800 yards.

May 19th.—Relieved about 1 o'clock to-day by Major Le Mesurier. Tombs, who commanded the artillery, told me I was to go on with my Heavy Battery to Mohamdi; Le Mesurier also with his. Camp shifted, but I could not move, having to supply a troop, a battery, and the details of heavy guns in the gaol and fort with ammunition and stores which they expect to-night.

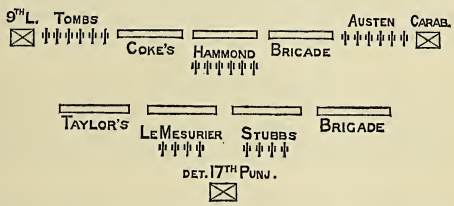
May 20th.—Very busy arranging for my battery to move. Enemy busy entrenching at the fort over there. Fearfully hot.

May 22nd.—Coke's Brigade came in to-day—Lind's Multani Horse, Hammond's Battery (3rd Company 3rd Battalion), 1st Punjab Rifles, 1st Sikh Infantry.

Sunday, May 23rd.—Battery moved to Lodhipur, where we bivouacked.

May 24th.—Our force marched on Barnai a little before day-break. Enemy opened at about 1400 yards, but their shot fell short. Le Mesurier leading was first in action on my left. Lots of cavalry about, which we were ordered to hold in check. After a few rounds they took themselves off. In the pursuit Hammond had a wagon blown up. Two men and a driver killed. Encamped at Jafnapur.

May 25th.—Marched at 3 o'clock. Coke's Brigade in front line; Taylor's in second; Heavies in rear. When we got close to Mohamdi, 10 miles from last ground, the cavalry, with the three light batteries, went to the front and, for some time, kept up a fire on the enemy, who were posted in the topes. We were halted. Some of the rebel sowars charged Cureton's cavalry, but got well pitched into. Beyond this, there was no opposition, and the rebels, as usual, disappeared.



Encamped a mile from Mohamdi. A number of cases of sunstroke in the infantry.

May 26th.—Halted. The fort here dilapidated; the town a miserable place: nothing to loot. Three guns got in a garden.

May 27th.—Halted. Tombs and some cavalry went to a fort about four miles off. It was a very strong one, and had a bamboo hedge on the outside of the ditch all round. They blew up part of it and brought back a lot of guns.

May 28th.—To Jafnapur.

May 29th.—To Shahjahánpur. The town is re-peopled since we

left: shops opened; bazaars crowded. More Hindus who salám than Musalmáns, who generally do not.

May 30th.—Got an order to go with Coke into the district. Countermanded.

May 31st.—Went in the morning to see how the unfinished Schoolhouse is. It is to be our barrack. At mid-day ordered to start with a column under Brigadier W. M. Taylor, C.B., 79th Highlanders, going to Shahabad. Tombs' Troop, a squadron Carabiniers under Major Bickerstaff, Cureton's Multanies, wings of 60th and 82nd, and 22nd Punjab Infantry. Captain Macguire commands the wing of the 60th. Take no tents with us.

June 1st.—Made a double march last night, resting for a time at Badsháhnagar; road execrable; got to Shahabad about day-break. Enemy fired a few rounds with precision as we came up, but fled, as usual, on the advance of the Horse Artillery and cavalry. Two guns captured, but horses had been taken out.

June 2nd.—Got back to Shahjahánpur at 7 a.m.

June 4th.—Shahjahánpur Field Force broken up from to-day.

Saturday, June 12th.—Alarms of war again. Hume sent down to Barnes' house with an 18-pr. and two mortars. Dined with Cureton at his mess.[1] City illuminated.

June 17th.—A report came in last night that the Mulvi[2] had been killed in a fight with the Raja of Powain. A squadron of Multanies went out to aid if necessary. Dined with Cureton and learned that the Mulvi had gone to Powain and demanded that a Thanadar and Tahsildar should be sent to Mohamdi to provide supplies. He was told that the Powain man had joined us. An altercation ensued, and some one shot him from the wall. The heads of the Mulvi and his Resaldar were cut off and sent in here. The bodies were brought in after I had returned to my tent.

June 19th.—All the bungalows in cantonments have long ago been appropriated and made habitable. We, having to look out for ourselves, fixed on a building at the upper end of the town, close to the Magistrate's office and our barrack. It was the tomb of the founders of the city.

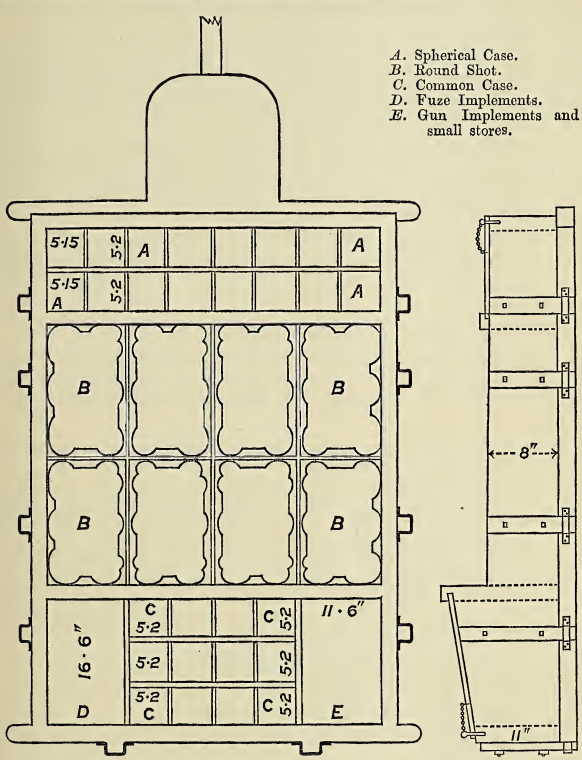
Sunday, June 20th.—Brigadier-General Sir Thomas Seaton arrived and took over command. General Jones has gone.

Between this and October alarms of rebels occasionally took place, but only on one occasion did the guns move out of park, then only to return. Shahjahánpur is well wooded with magnificent trees. There was abundance of well-seasoned timber to be had, so, as there was another campaign ahead, though I might not be in it, and plenty of

[1] These alarms generally came from the chief Civil Officer, and I always went to Cureton, whose information was never out, to know how far my preparations should go, as we had to be always prepared on very short notice, extra orders were rarely necessary.

[2] Ahmad Ali Sháh, a native of Arcot, had come to Faizabád, in February 1857, preaching a religious war against us. He was captured and imprisoned, but released on the outbreak of the Mutiny in June, and became a leader of the rebels and the trusted adviser of the Begam of Oudh.

time, I made up better ammunition carts for each gun and howitzer, of which the accompanying sketch will give an idea.



August 17th.—A letter from Austen at Simla tells me I am to rejoin my troop, and Captain W. F. Cox relieves me. He has just been posted to the 4th Company, 4th Battalion.

September 12th.—Orders from Meerut direct me to prepare ammunition, &c., for four 24-prs. and seven 8-inch mortars to be ready to march on the 1st proximo. Everything has to come from the Delhi magazine. Not much time to do it in.[1]

September 18th.—Seaton will not allow any of the ordnance here to be used for the Siege Train. The rebels are entrenching themselves at Pasgáwan, some 14 miles from this.

[1] It was manifestly impossible to get a Siege Train ready by that time had it even been telegraphed for. Whether it ever reached Shahjahánpur (distant 18 marches from Delhi) or not I do not know.

October 1st.—The northern party of rebels have crossed the Gumti and come as far as Mohamdi. Colonel Clarke, the Commissioner, told Sir T. Seaton that they intend coming this evening. We are ready to welcome them. Under orders to turn out to-morrow morning.

October 2nd.—As we expected, the rebels are still at Mohamdi and Pasgáwan. The great comet of this year, returning after its 300 years' absence, appears every night in splendid brilliancy, going down now about two hours and-a-half after sunset.

October 6th.—A letter from home to-day encloses one to my father from General Day. He speaks very highly of the work we did, and said that his experience with a Siege Train in Afghanistan was not so severe as ours. Sent his letter to Franks.

October 7th.—Orders to be ready to go out to Powain with a gun and howitzer to accompany Sir T. Seaton's force this evening, but only crossed the bridge, when I was sent back. Cookworthy went with Austen's guns.

October 8th.—Heard firing this morning for about an hour. The force returned in the evening, having killed some 300 of the rebels and taken two guns.[1] General Orders post me, on promotion to 2nd Captain, to the 3rd Company, 6th Battalion, with a field battery at Peshawur.

October 11th.—Orders in to-day for the formation of a column under Brigadier Troup to go into Oudh.

October 15th.—Brigadier Troup's column came in this morning and encamped in rear of the gaol. It is composed of the following corps:—

Head-quarters and 3rd Troop, 3rd Brigade, Horse Artillery. Lieut.-Col. F. F. Remmington, C.B.
Two guns 1st Company, 1st Battalion, under Lieut. Wake.
4th Company, 4th Battalion. My Heavy Battery.
} Lieut.-Col. J. Brind, C.B. Capt. H. P. Bishop, Brigade-Major.

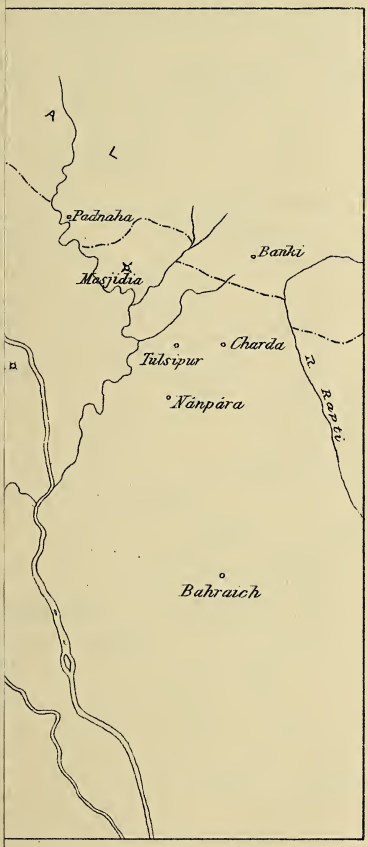
Three squadrons Carabiniers—Major Sawyer.
Multani Regiment—Major Cureton.
60th Rifles—Lieut.-Colonel Dennis.
93rd Highlanders—Lieut.-Colonel A. Leith-Hay.
66th Native Infantry (Gurkhas)—Major C. C. G. Ross.

Hume still with me. Heavy armament—two 18-prs., one 8-inch howitzer, four 8-inch and two 5½-inch mortars.

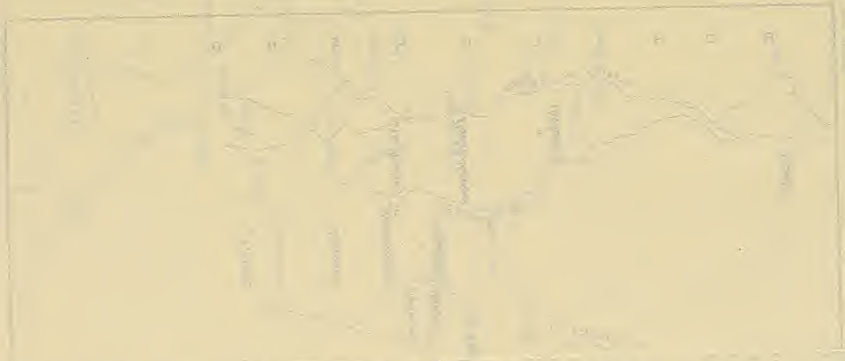
October 18th.—A short march of eight miles. Road a raised kutcha one. Village of Surai in front, Jamki in rear. Enemy entrenched in front about five miles ahead.

October 19th.—Marched with guns and howitzer at day-break immediately in rear of Remmington's Troop; the Carabiniers, Rifles, and Highlanders behind me; then the baggage, and, lastly, the Gurkhas. Wake's guns and a troop of Multanies as rear-guard. Went through a very dense dhák jungle, extending very far on either side. After going four miles, most of it at a trot, the enemy's cavalry shewed in front but did not come down. Two of the Horse Artillery guns with some Mul-

[1] This fight was at Bankagaon.


Padnaha
Banki
Masjidia
Charda
Tulsipur
Nanpara
R. Rapti
Bahraich

THORN, WOOLWICH.



tani Horse (the latter had been working through the jungle on either side) formed on either flank on getting near Madhupur and came into action to clear the jungle, but as it did not appear to be occupied we went on, and the heavies unlimbered at 1100 yards from a battery made across the road: the rebel guns were at work as we came up. A very few rounds shut them up. On again, and opened with one gun on the village with round shot, the flanking parties keeping up a cross-fire as they advanced. Colonel Brind then called on me to follow him, and we both galloped up the road to the battery, which was pretty well knocked about and deserted; one of the two guns dismounted, trunnion plates broken. We then went on, Hume bringing on the gun last in action behind the infantry, which passed him as he was limbering up. Beyond the village the country was a little more open, but where there was no dhák jungle, there were topes of trees or patches of high sugar-cane or jowási, most difficult to clear of an enemy. Hume, when he joined me, reported he had passed a body of men mounted who he said looked "queer," but they did not notice him, so he went on.

About half-an-hour after we had passed Madhupur and were waiting for the carts to close up, a Multani came and said that the enemy had reappeared out of the jungle and fallen upon the baggage. Cureton went back with his men and saved us from much loss, but a Highlander and several hackery-men, &c., were killed—the wife of one of my camp followers among the number. Ensign T. Bird,[1] doing duty with the Horse Artillery, had a narrow escape. My little dog Nettles lost in the scrimmage. Encamped on very enclosed ground. A party of cavalry with two guns were watching us from a tope, but bolted as soon as discovered.

October 20th.—Halted. Burst the guns taken yesterday about half-a-mile from camp: rather close. A lad sitting behind some bushes a couple of hundred yards away had his leg taken off by a fragment. Brind went out this morning with a couple of guns, a company of Rifles, and some cavalry. Colonel Clarke, Civil Commissioner, had some of my bullock drivers flogged, who were collecting bhusa in Pasgáwan. Handed the matter up to the Brigadier. The bullocks were on the trot nearly all yesterday's march, and must not starve.

October 21st and 22nd.—Halted. An escort with Wake's guns went to bring out stores from Shajahánpur. Ensign J. Milrick[2] ordered to do duty with Heavy Battery.

October 23rd.—Escort returned with stores. Captain W. F. Cox came with it; also, my terrier Nettles, quite of her own accord. Brind went out with a reconnoitring party of cavalry with two Horse Artillery guns in the afternoon. The rebels at Mahmudipur opened fire on him, so he returned.

October 24th.—Order for march countermanded. Made over command of the company and battery to Cox, but remain with it as yet.

October 25th.—Marched at 3 a.m. Most of the 93rd on the flanks of the baggage. Country not quite so difficult. Got to Mahmudipur,

[1] Promoted from Sergeant-Major, 3rd Brigade, Horse Artillery, for good service at Delhi.

[2] Promoted Ensign from Acting Staff-Sergeant 4th Company, 4th Battalion, for service at Delhi.

where the rebels had been. Between it and their present position at Rasulpur, there is a long extent of uneven country covered with low brush-wood, intersected by a deep, winding nullah. The baggage and park was formed up on an open space close to the village with the nullah in front. We went on through the village, Remmington and the cavalry going round on the right. When well clear of the village, the enemy opened fire from a tope at Rasulpur, about 1800 yards off. The rebels got a gun through the dhák shrubs close to us, but Remmington disposed of it. Their fire was accurate and almost entirely directed on the heavies; the shot ricochetted in between them, and there were several narrow shaves, but the men kept a good look-out. Their cavalry and infantry were numerous. They advanced on our left towards the baggage, and we could hear them making a tremendous row, shouting and yelling, and the Highlanders kept up a good deal of file firing. Fearing another charge on the heavies, I was watching them through a pair of binoculars from the top of a wagon, something smashed against my wicker helmet and nearly toppled me over. Shortly after, as I was about to get down, a gunner came up holding a shot, about a 3-pr., in his hand, saying—"Here's the shot that hit you on the head, sir." Only one man of ours, a bildar, was wounded. Remmington advanced, bringing forward his right, and opened fire again, but by that time their's had slackened and soon ceased. When we advanced through the tope there were branches of trees lying about in quantities, but I only saw two bodies of men and two horses; their cavalry had suffered severely in the attack on our left. In a field not far off were found the bodies of seven or eight of their women, hacked to pieces with tulwars, to prevent their falling into our hands. We only got one gun; another had burst. From the depositions of some of the prisoners, it appears that all the rebel chiefs of this part of Oudh were present: Khán Bahádur Khán, Khán Ali Khán, Firoz Shah, Mausum Ali Khán, and some others.

October 26th.—To Baraur, a pretty large village, only three miles from last ground. We can't make out why Troup is so slow: it is not like him; he might have followed as far as this yesterday.

October 27th.—Six miles to Naurangabad.[1] Rebels said to have gone towards Pilibhit.

October 28th.—Halted. The Raja of Mithauli has been written to, to come in and stand his trial or take the consequences. This is the place where the Shahjahánpur fugitives were murdered in June 1857. The spot has been found. It is under a pipal tree, about three-quarters of a mile from the town,[2] on the road by which we came.

October 30th.—A quantity of stores I had indented for came in yesterday. Captain Graham, Commissariat Department, a son of Col. Charles Graham, of our Regiment, with them. Four guns brought in;

[1] Aurangabad on all the latest maps.

[2] While here, Ensign Bird, I think it was, found in a village close by a little toy which one of the poor children must have carried away from its home and kept through all their wanderings from village to village, in all the terrible heat and privation of that time, and, perhaps, was holding in its little hand as they were being shot or cut down. It was a Swiss toy-girl with mechanism, when wound up, to move over a level surface. When placed on our Mess table, there were none of us for the moment could utter a word.

two of brass, and rather pretty. One had on the breech-ring, "Henry Lithgow fecit." One iron, small in bore, but 6 feet 9 inches long. The latter was burst. Hume ordered to-day to do duty with the 3rd Troop, 3rd Brigade, Horse Artillery. He and I rode out some three miles beyond picquets but saw nothing. Villages are empty.

October 31st.—The Sappers, under Captain F. R. Maunsell, arrived to-day. Three iron and one brass gun brought in to-day. One was merely the breech and part of the first reinforce of a larger one (10 or 12-pr.) of very primitive make—longitudinal iron bars forming the bore, with strong iron rings shrunk on outside. A shot had carried away the chase, and the ends of the bars had been doubled back over the remaining rings. So, taken out again to fight, poor thing.

SKETCH FROM MEMORY.

November 1st.—A parade in review order to hear read the Queen's proclamation assuming the Sovereignty of India. Cox fired a Royal salute with the big guns. The Mithauli Rája wont deliver up his headman, the brute who handed over the Shahjahánpur fugitives to the Sepoys.

November 3rd.—Marched to Nikára. The Brigadier has written to Seaton about looking after his camp equipage and baggage while he goes against Mithauli.

November 4th.—Rode with Wake over to the Gumti, three miles west of camp. Country ought to be good for game, but only saw partridge and quail. Our baggage is to go to Muhamdi; we take nothing but bedding and grub. Cut mortar fuzes to-day; all have to be re-graduated as well.

November 5th.—By 12 o'clock every tent and cart was off, and we are light enough to go anywhere. Ismail Khán has written in to ask if the term "British Subject" in the Queen's proclamation includes natives as well as Europeans. The reply was a copy of the proclamation. Cut more fuzes to-day.

November 6th.—The escort sent with baggage did not return till 11 o'clock, so our march is deferred. There is a bridge over the Katna river between this and Mithauli; it is a long way round, but the ghat on the direct road is occupied and entrenched. Set a number of hand grenades for the Engineers. Ordered to march at 12 o'clock to-night.

November 7th.—Got out of our ground at midnight, but the regiments not having concentrated when the baggage went, no one could find out in the dark where to go. One of the staff went down a well; the Provost-Marshal went into another; but at last all were got together, and we went towards Aurangabad and then changed our course

for Maholi, which commands the bridge. The enemy, expecting a direct attack, were not here. Got in at 11 o'clock.

November 8th.—Marched before day-break. At five miles came on the rebel cavalry and guns. The Horse Artillery opened upon them and drove them back; the country not so open here. They took up a position at Baragaon, from which a second fire of shrapnel dislodged them. Firoz Shah, with two guns, was here and retired on Mithauli; Khán Ali Khán, with 2000 men and 6 guns, in an easterly direction. We then began to enter the thick, dhák jungle round Mithauli, nearly a mile through, and progress was very slow. On emerging into a cultivated field, interspersed with topes of trees, the cavalry were sighted again, but they did not stay to reply to us. We went on, rather uncertain as to the proper direction. A rifleman went up a tree but could see nothing. However, when we had gone about a mile and a-half over fields, the guns were brought into action upon a bamboo fence, which proved to be the place. Brind, after reconnoitring, chose a place to the right for mortars, and to this I was sent with a small detail of the 4th–4th, Bird, the Provost-Marshal, and Hume with some of the Troop, to serve them. Got three mortars into play at once, and afterwards a fourth. They saw us and kept up a hot fire from the south-east bastion, opposite us, nearly 1000 yards off. Brind then went off to the heavy guns and got them into action again, somewhat nearer. Shelling lasted till dark. We had no casualties, but at the heavy guns Gunner Royal and a driver were killed; Bombardiers Muir, Bradley, and two lascars wounded. By dark the fort was silenced, and they only discharged some small piece every now and then. My covering party, a company of Rifles, I had increased by a company and a-half, as we were detached from the rest and threatened on the right flank. We were well posted in a small patch of jungle which covered front, right and rear, and Preston,[1] commanding the Rifles, made a very good disposition of his men along the edges of it. Found some straw and made ourselves comfortable for the night. It was impossible to find out where the rest of the force was. Dined chiefly on a pipe.

November 9th.—The fort was empty this morning. Got seven guns there, two large.

November 12th.—Rode with Cureton to the Paruya Ghát and took a sketch of the battery on the direct road from Nikára. It was a semi-circular breastwork, only about 2½ feet high, on a little knoll, 30 feet above the stream and 300 yards from the Ghát. They had cut the road in several places and laid trunks of trees across. Brind still thinks we should have come that way.

November 13th.—Breakfasted with the Engineers, and got Holmes' plan of the fort. Inside the rampart are two bamboo hedges; the outer one 60 feet thick, and separated by a 19 feet ditch from the inner one, which is 20 feet thick, and older.

November 17th.—Troup left this morning for Aliganj, leaving Colonel Hay in command here with the light artillery, two squadrons Carabiniers, Multanies, 4th Irregular Cavalry (joined us two days ago), the

[1] Now Viscount Gormanston, Governor and Commanding-in-Chief, Tasmania.

60th Rifles, and wings of the 93rd Highlanders and Gurkhas. Remmington being ill, Mercer went in command of the Troop.

November 18th–19th.—Surveying vicinity of fort towards Maholi with my prismatic compass.

November 20th.—As I was sitting over my plan in the afternoon, who should ride into camp but Austen, looking for his guns, and very indignant that Price (who had been ordered to relieve Wake, transferred to Horse Artillery) should have left without reporting himself. He tells me there are two or three down for Horse Artillery before me, and as his 2nd Captain (Timbrell) is not likely to join, I am to apply for exchange into his battery.

November 21st.—Austen returned to Shahjahánpur.

November 25th.—The rebels who fled after their defeat at Mehndi are now at, or near, Khairabád. Barker[1] is coming up in that direction. A letter from Aliganj says the rebels could not be followed up as it was dark. On the 18th, Brind was detached by Troup, with Mercer and the 3rd Troop, a squadron Carabiniers under Bott, squadron Multanies under Dixon, and 4th Irregular Cavalry under Captain Hall, and 36 riflemen carried on the limbers and wagon-bodies. They came on the tracks of the rebels and followed them in several turnings for 25 miles to Mehndi. Mercer with the right-half troop took them in flank, which they did not like, and the left-half, limbering up as they bolted, went to the front and prevented the guns being carried off. The cavalry worked admirably, and it was altogether a very creditable affair. Two sowars charged through the left-half troop, touching no one, but went at the Irregulars in rear and were killed. They were driven into the river Chauka, where numbers were drowned. A Carabinier and troop horse were killed, one horse wounded by some men under the river bank. Ten guns were captured.

November 27th.—Marched at day-break for Hargaon to join Troup, but were taken off the road through the thickest part of the jungle, breaking four poles of the heavy pieces and some yokes. The baggage, which had re-joined us, was ordered to march on the reverse flank, but, being a little out of control, got in front and on both flanks. Never made a march like this before. Encamped at Haidarpur on the Sarain river.

November 28th.—To Hargaon, five miles.

November 29th.—To Talgaon.

December 1st.—After marching 10 or 12 miles, we sighted the rebels in topes at Baswán.[2] They separated right and left, avoiding the direct attack. Remmington with two guns and 2nd Sikhs advanced to left front. Mercer with two more to the front and right. Further on that flank Cureton, with two squadrons, was charged by about 800 sowars, supported by guns and infantry. Unequal as the odds were, he formed to the right, counter-charged, and drove them back into the

[1] Brigadier G. R. Barker, C.B., R.A., commanding one of the columns.

[2] We call it Biswah, after the old spelling. Modern maps say Biswán.

topes, and the gunners from their guns. The last he could not carry off. The rest of the column came up, heavy guns in centre. The rebels soon drew off. Twenty bodies lay where Cureton had charged; two Sayads of high degree. Early in the business I was sent back by the Brigadier with a message to the infantry, and coming up hard, as soon as the guns were heard, was charged by one of the elephants in passing, and my horse turning, went head foremost into a ditch, turning over on me. So I was carried into and out of action.

December 3rd.—Still confined to my tent, though not on sick list. Brigadier Barker's column came in and encamped on our right. Firoz Shah has got round our left; they say he wants to join Tantia Topi. Ismail Khán has offered to come in.

December 4th.—Ismail Khán came in. Received with too much honour. The 2nd Sikh Cavalry and 8th Irregulars (latter one of Barker's) left last night in pursuit of Firoz Shah.

December 5th.—Ismail Khán's horses sold. One was a charger of Bishop's, lost when they attacked our baggage at Pasgáwan. One a charger of Captain Wardlaw, Carabiniers, who was killed last December at Khásganj.

December 6th.—Barker marched to Bári. We to Sherpur, about 12 miles north of Biswán, leaving Colonel Leith Hay behind with the baggage.

December 7th.—Were to have gone back towards Jahángirabád, but are halted. Ordered to return to Biswán.

December 8th.—Back again to Biswán. Colonel Brind to start at once with all the Carabiniers and some other cavalry in pursuit of Firoz Shah, even into Central India, but has to go *viâ* Cawnpore.

December 10th.—We went to Jahángirabád. Mounted a horse for the first time for half the march.

December 14th.—Got a letter from Austen yesterday asking me to take over his two guns from Price, who has been ordered to Agra to the newly raised company of Eurasian Artillery in anticipation of being posted to his battery. Was put in orders, said good-bye to the heavies, and with an escort of two Multanies, rode into Biswán. Dined with the 93rd, who very kindly made me an honorary member of their Mess. Next day Colonel Hay's column marched to Sitapur.

December 21st.—Barker's column came in to-day. We march to-morrow towards Parbatpur on the Chauka river to co-operate with Troup, whose force is now divided into three.

December 22nd–23rd.—To Dhundi and Laharpur. The list of brevets and C.B.'s out. Cureton is only a Major.

December 26th.—To Kheri.

December 27th.—To Dhanupur.

December 28th.—To Sarwa, forming on the left of Troup's camp.

December 30th.—Ashraf Ali, Rajá of Mohamdi, gave himself up.

Bought one of his horses which were sold, a half-bred Arab, for 330 rupees.

December 31st.—Went with Brigadier Troup to visit the Sappers making a bridge on the Ghági branch of the Chauka river. Heard firing from the east. We thought it was from Dennis' (60th) column, that way, but it was further off.

January 4th, 1859.—Moved ground to the other side of the river Ghági. A thick, high, grass jungle had to be traversed, through which the Engineers had been cutting a road, but it stopped half-way, and there was more than a quarter-of-a-mile, not quite, but almost impassable. The difficulty was solved by putting an additional pair of horses into each gun, and with them in front, followed by the wagons, a passage was opened. Strict orders to my men to keep their pipes in their pocket were obeyed, but it was not so easy to get the infantry soldiers to do likewise, and this was the only danger.

January 7th.—Colonel Dennis has moved from Tilhiári.[1]

January 9th.—Marched to Tilhiári. We have to watch the Shitába and Mathiára Ghâts.

January 17th.—A grand shooting party. All the spare Commissariat and three of the Rája of Dhaurára's elephants out; beat an extensive grass jungle, but got nothing. Plenty of hog deer seen. There were also antelope and pigs, but no traces of tiger.

January 19th.—A report last night, and letter to-day from Dr. Innes, 60th Rifles, tells of a fight Dennis's column had. Dixon of the Multanies severely wounded. Horsford's Brigade was at the Sadharia Ghât, on the river Rapti, seven days ago.

January 20th.—Races to-day. My horse Gujar, rode by Stuart Mackenzie (93rd), won the third race against Blake's (93rd) mare Kate Coventry.

January 22nd.—Races finished. Won a match which Colonel Leith Hay (or some one for him) made last night; his mare Kitty against the Gujar, owners riding. The Gujar would not start at first but soon came up, and won by a couple of lengths.

February 1st.—Heard of the death, at Pachpera Ghât, of poor Dixon, of fever, supervening on the wound.

February 5th.—Ordered last night to start for Sitapur with my two guns and a troop of the bays, so I bade my kind friends of the 93rd good-bye after dinner. Lieutenant Payne commands the Troop.

February 9th.—Reached Sitapur. Colonel Dennis (60th) commands here. Am to remain till the arrival of "E" Troop, R.H.A., under Major Middleton.

February 11th.—Am re-posted, in General Orders, to Colonel C. V. Cox's Troop, Horse Artillery, at Rawal Pindi. Applied to Austen to be relieved.

[1] Tilahr on map.

March 7th.—Under orders from Sir Hope Grant, commanding in Oudh, I am to leave Shahjahánpur with the 1st Bengal Fusiliers. There is a dark-haired, curly-headed boy just joined them as Ensign, Cavagnari.[1] His father lives in Dublin, and was in the service of one of Napoleon's brothers.

March 12th.—Got to Shahjahánpur.

April 5th.—Reported arrival at Rawal Pindi, and joined 4th Troop, 2nd Brigade.

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[1] Afterwards Sir Louis Cavagnari, British Resident at Kabul, where he was murdered.

(*Conclusion*).

SOME SITES OF BATTLE.

BY

CAPTAIN C. E. CALLWELL, R.A.

To the mere soldier, Athens, in the heats of summer, has little to recommend it. The archæologist may roam entranced through its dusty, glaring streets in search of some memorial of the past; its graven images and crumbling columns have a meaning to him; even the language of the urchins at their play appeals to him. But we, when we have done the Parthenon and have sat awhile on Mars Hill to rest and look around, are glad to train it down to the evil-smelling Piræus and skim out over the blue waters of the Attic Gulf, where, in the evening, a cool, fresh breeze is always to be found. Then it is but an hour's sail to Salamis.

How seldom it is that episodes of naval war leave behind them a lasting trace. Deep down, where none can pry, the hulks may rest for centuries; for a time *debris* may strew some neighbouring shore; but then all melts into oblivion, the spot where the great epoch-making battle on the seas took place is soon forgotten, there remains but a date, a name or two perhaps, and nothing more.

Not so at Salamis. No sea-fight has had a grander sight than this. The amphitheatre of rugged hills, the fringe of ruins where the ancient city stood, nay, the very shores itself, all serve to mark the scene of conflict. Each reef must have its history. Each island is a monument. Before you reach the actual site of battle, you pass the lofty ridge of rock, now crowned with batteries, called Lipso Island, which was the scene of one of the most stirring incidents of the fight. The night before, some of Xerxes' men seized the island, which, to a certain extent, bars the approaches from the Aegæan to the bay of Salamis, as part of the plan for closing in the great flotilla in the cramped channel where it lay. Picked men they were, the flower of the Persian troops. But when the fortunes of battle decided against the Asiatic array, Aristides, the great rival of Themistokles, somehow got across with a party of Athenians, and at nightfall not a Persian was left to tell the tale of how they fared upon the island.

There was something very fitting in this episode. It was but right and proper that Aristides should undertake this bit of work, and that he should be the man to control the one noteworthy land operation of the day. For he had to the utmost of his power thwarted Themistokles in his great project of changing Athens from a Land into a Sea Power, a project which the man of action and resource had pressed upon his countrymen, and forced upon them by his importunity almost before the blood upon the plains of Marethen was dry.

Mouldering walls alone are left of what was once the thriving town of Salamis. Here wives and daughters, old men and children, sought refuge when Athens was abandoned to the invader, as Moscow was to be abandoned in a later age. They crossed the channel from the Piræus to the island, bearing what little of their property they could take away. All night the lurid glare from the burning city which had been their home had lighted up the Eastern sky. They probably knew, many of them only too well, of the sore dissensions amongst the chieftains of the heterogeneous naval force to which they trusted for protection, dissensions silenced only when at early dawn the council found the exits to the Salamis channels closed and a decisive action to, therefore, be inevitable. It must have been an anxious morning for the fugitives as they noted, beyond the meagre line of Grecian vessels stretched across the bay, the foe's great fleet form up for battle. Beyond this again, marshalled on the hill-sides of the Attic shore, the keen-sighted could descry the formidable cohorts which had come from Susa and Persipolis to tread them down. They may have guessed that over there, from some high rocky throne, arrayed in all the barbaric splendour of he East and surrounded by his satraps, the dread Persian King was looking down upon the scene, confident of victory.

In character and temperament, Themistokles resembled not a little Marlborough. Possibly his master-stroke, the suggestion borne to Xerxes by a trusty messenger to hem in the great flotilla, whereby the Corinthians and others from the south who meditated flitting were compelled to stay and fight it out at Salamis, had no other motive than pure patriotism. The winning of the Persian's friendship, should he gain the day, may not have been the trump card of the Athenian chief. It matters not. Themistokles' message to the King decided the fate of Greece and of the civilised world of the day. Once fairly at bay, animosities and differences between the leaders from the various States of Greece ceased, and the contingents vied with each other in their daring, and in their zeal for the common cause.

An inferior fleet was not ill-posted in a bay before the era of long-range artillery. Brueys wisely enough ranged his squadron in Aboukir bay well inshore, so as, if possible, to hinder Nelson from closing, but failed in his design, which, against an antagonist less daring and determined, might have served him well. Against the Greeks, likewise drawn up in a bay at Salamis, the crushing superiority of the hostile force could not be developed. Ram tactics were the feature of the fight—not the ram tactics of to-day, no prodding down below the water-line with its fearful consequences. No. The shock tactics inaugurated in this battle consisted in striking the opposing vessel on its broadside with the beak or prow, or else in the oblique blow which destroyed the oars of the hostile craft on one side so rendering it unmanageable. At work like this, the crews of Xerxes were no match for the Greek sailors, highly drilled as they were, and guided by helmsmen as experienced as they were intrepid. As in the days of the great Armada, seamanship told, and told decisively. Within a few short hours the mighty Persian fleet was in confusion, dispersed and flying, routed by a force of scarce one-fifth its strength, beaten as few fleets have been

before or since. The swarms of refugees from the Attic plain were safe. The East on one of its periodic swoops upon the West was checked and brought to nought. It is an old story now. But as you go about and head away past Lipso for the open sea, you feel the afternoon has not been lost in searching out this quiet land-locked sheet of water. To-day the little fleet of modern Greece rides peacefully at anchor on the outskirts of the battle-field, now developed into a naval harbour of some note. Will it, when its time comes, play a great part, as did Themistokles' triremes in the brave days of old?

Your tactician loves St. Privat with its glacis slope. Its story illustrates one of the grand rules of conduct in the modern game of war. But, well as the tale is told in the "Official Account," it is told far more vividly by the grassy hummocks and lichened monuments which rear their heads above the sumptuous corn. Drop tactics for a moment, go read the names awhile, then conjure up the picture of what happened on that torrid August afternoon a quarter of a century ago. It seems so pitiful to think of these huge columns out helpless on the bullet-swept plateau, gaining nothing by holding on, incapable of advancing, resolved not to give way. Yet to some of us the interest of this great fight of Gravelotte seems centred at another point, away to the south, in front of the village whence the battle gained its name. Here, under the eyes of the old King himself, the German legions were from noon to nightfall held in check, were at one time, indeed, swept back in dire confusion. Here the French held their ground when darkness closed upon the scene. And here it was that Hans got his chance, and took it.

Hans was a driver in the 3rd Horse Artillery Battery of the VIIth Corps, a simple fellow who had no proud looks. He had but a bare year's service when the war broke out; and after much bustle as reservists hurried in and horses came to hand, found himself lead-driver of the flank gun, with old Gretchen, bay with a bit of white blaze, for off-leader. Many a time in his early loutish days he had battered round the dusty *manège* clinging to her slippery back, and she had mostly done him well.

When morning broke, on the 18th August, the battery had not been fairly blooded yet, and as, after some hours of hot marching, towards mid-day they passed through a big village, which Hans heard the Captain name as Gravelotte, all of them, officers and men, felt something of a thrill. For just beyond they came of a sudden out upon the battle-field. Guns to left of them, guns to right of them, seemingly for miles, thundering away; while from the front, where the enemy shewed up plain enough, answer came but fitfully. The battery soon found its place, a little south of the high road, and set to work; then Hans, whose gun was on the left, found time to get his bearings and take in the scene.

It was, indeed, all plain enough. Whether you view it on a map, or on the ground from the plateau east of Gravelotte, the French position on the left is strangely well defined. Hans noticed how the road which they just had left dipped down a sort of cutting, disappeared, and then shewed up again across the valley by a red-roofed house, surrounded by farm-buildings now a blaze of musketry. Months afterwards he heard its name—St. Hubert. From where they were, neither the great

embankment by which the high road crosses the deep ravine between the French and German positions, nor yet the ravine itself, were visible. But Hans soon grasped that friends had got across and held the big house, where they seemed sore beset.

An hour or two of steady pounding followed without one single casualty in the battery. Then suddenly to the left rear arose a mighty clatter, much shouting and sharp clank of sabres. Cavalry were mustering, noisily as is their wont. Pausing but a moment where they formed up, the horsemen defiled at a quick trot down the road into the cutting. Then the order came to limber-up. Another battery from the left, a field battery, came up and followed the cavalry down. And then, Hans leading, the battery moved off at a walk, heading for the cutting, and halted just where it began. It was all blocked with guns and horsemen in confusion, a shocking sight. The French had got the range and were not silenced yet. Their fire enfiladed the defile and not a shot was lost. No practised soldier's eye was needed to see that there was tough work in hand for all of them. The halt was not of long duration. Gradually the throng dissolved, and the road grew passable. Hans and the others instinctively shortened reins. The captain gave the signal to advance. *"Mit Gott!"* said the corporal. And they rode down the hill for their lives.

Scarcely were the horses fairly in their stride when a shell burst with startling crash almost at the leaders' feet. Another struck the bank just to the left, spurting up the earth and stones. Savagely the enemy was pouring in his fire on this bit of hollow road, dealing destruction, as riderless horses and the dead and wounded here and there shewed but too well. Gathering speed, they came, just where at the bottom the road sweeps out on to the embankment over the ravine, upon a struggling mass of men and horses. A gun of the battery ahead had somehow come to grief. The defile was all but choked up. There was no time to take a pull. It was the closest thing that ever was, but they got by. And then—Hans was new to the sort of thing, it gave him quite a turn—out on the embankment, with a queer kind of hunted look upon his face, there was an Uhlan on foot coming towards them. He did not heed them nor seem indeed to see them; for though *Herr Lieutenant* warned him with a cry and the corporal screamed a curse, they rode over him, and Hans heard afterwards there had been merely one convulsive tremor as the gun-wheel went over his back.

But the captain was already waving to them to strike off the road on the other side, to the right. There was a sharp bit of rise for a yard or two, and they put their horses at it with a shout. Just when they reached the top, the riding leader plunged wildly forward and came down heavily on his head; and when Hans, dizzy from his fall, had struggled up, the limber-gunners had got Gretchen clear and tossed to him her reins. The riding horse was badly hit and struggling helplessly. Then, at a foot's pace, the gun moved on, past the rear of the field battery now in action along the road near the big house, and unlimbered a stone's throw further on. The other guns formed up on its left, and soon all were hard at work, blazing away at short range into the French, who were quite close at hand and in great force.

For a time Hans was employed bringing up ammunition from the

limber. Gretchen he had tied up to the wheel on the sheltered side. So engrossed was he on the service of his gun that some strange incidents close by escaped him. The bolting of the limbers of the battery which followed his across he never noticed, nor its retreat, nor yet the disappearance of the cavalry back towards Gravelotte. Two of the detachment were down already, and another horse. Bullets kept whizzing around, and many struck the gun and limber. The wheel-driver, Hans' chum whom he had known away in his native village almost since he could speak, was struck down beside him, shot right through the head. Then the idea came to Hans, why should he not slip off back to the ravine. No one would miss him nor think of him. Why should he stop out there in the open to be shot? Was it good enough? He made a move to go, though in some doubt. But he thought suddenly of Gretchen left alone tied up to the limber wheel, and —and he turned back determined to see the thing through. He thought no more of danger or himself. From that moment he did the work of ten men. One moment at the trail, the next straining at a wheel, the next staggering up with ammunition. Yet, in the very thick of it, he managed every now and then to lend a hand to wounded comrades, or to buoy them up with what they wanted almost more, a whisper of encouragement. And when he came upon the corporal lying stark and stiff—the corporal had been a rough fellow enough, with much wealth of guttural expletive, harsh to young hands, violent when crossed, feared not loved—Hans thrust a crumpled cartouche into the rut in which his head was jammed, that he might rest the easier.

They had been out, right in the enemy's position, almost unsupported, for three hours. The cavalry had gone. The infantry were crouching under cover. Ammunition now was well nigh spent. Hans' limber was empty, that next to it was empty, only a few rounds remained still, further down. Some while back he had seen an officer gallop from in rear up to the captain and point with eager gesture towards the hollow road, and had seen the captain shake his head. Another came rushing breathless up on foot urging retreat, but the captain stamped his foot and turned away. Yet now, at last, the time had come to go. Ammunition all was gone. The game was up. The order came to limber-up. And a strange procession the battery, which only a few hours before had trotted out upon the battle-field from Gravelotte complete down to the last tie, formed as it slowly wended its way back to safety.

Hans and two others hooked in Gretchen and another horse—the only two remaining in the team. Then, by a desperate effort, they managed to limber-up. And Hans prepared to lead the horses down. The gun next to them took longer to prepare, and the captain called to Hans to pass it and move on. It was the first time and the last in his service that he disobeyed an order. He would not stir. Wounded men, who had clambered on to the limber and axle seats, prayed to him to go on for the love of God. But Hans doggedly stood still, deaf to their entreaties. He and Gretchen had been the first to cross, they should be the last to go. And when the gun in front at last got off and with two drivers mounted started at a swinging trot, Hans gloried in being left behind to bring up the rear. Even the captain had hurried on, for one of the leading guns had broken down.

The battery which had crossed before them was still in action, sheltered somewhat by an orchard wall. It was just like a field battery getting behind a wall while the Horse Artillery had fought it out in the open, so Hans thought. And now, from across the ravine, echoing out above the dim and whirr of battle, a great roar arose, a roar from ten thousand throats. The hollow road was black with multitudes of men. The rigid bonds of German discipline, strained by the excitement of what had gone before, had snapped asunder at the sight of the shattered remnants of the battery defiling slowly back out of the very heart of the enemy's position. Louder and ever louder rang the cheers. Hans had reached the foot of the hill and moved out on the embankment. It was here, just on this very spot, he remembered, they had ridden down the Uhlan. There were only a few more yards to go to reach the hollow road. Some were rushing out to meet him, and one or two were already at the wheels. But Gretchen of a sudden lurched forward with a kind of groan, gave a feeble struggle or two, and then crashed down upon her side. Mechanically Hans set to work to get her clear, he knew her race was run. He vainly strove with trembling fingers to undo the buckles. Everything was twisted and disordered, and he had no knife to cut the gear. Then he felt a great shock which knocked him sprawling in the road, and knew that he was hit. He staggered to his feet. Somebody—a *Jäger*, he had a green sleeve—seized him by the arm and got him along. Another helped him on the other side. Now they were surging all around him, pressing and fighting to grip his hand. They tried to lift him shoulder-high, unmindful of his wound. Kings might have envied Hans his welcome. But all seemed very far away to him, everything was swimming before his eyes, the very ground appeared to heave. The thundrous "*Hochs*" buzzed strangely in his ears. Almost as in a dream he saw the throng make way a moment for a grim and grey old man, who stepped up to him with something like a quiver on his lip. Instinctively he pulled himself together to salute. And then he knew no more about it all till he was brought to in the dark watches of the night by a doctor man prodding inside of him with something sharp. It had been a big day for Hans, and Germany.

The French say of us, or, perhaps, it is we who say it of ourselves, that we never know when we are beaten. This confidence, especially when coupled with the power of inspiring it in followers, is one of the most valuable qualities that a leader can possess. No general has displayed more markedly this characteristic than Napoleon. And never did it serve him so well as on the battle-field where he won the crown of France, Marengo.

The seldom visited battle-field of Marengo does not lend itself to tactical study on the ground. It is the place rather for the sight-seer than the soldier. The topography is featureless. A plain studded here and there with villages, a few great roads, some scattered vineyards, a tree or two, and that is all. The sluggish Fontanone brook, marking the line which Lannes and Victor held so stoutly in the morning, serves as a guide at first when driving out from Alessandria; but, except for the villages of Castel Ceriolo and Marengo, both held at the outset by the French, and San Giuliano four miles to the east, there is next to nothing one could show upon a map.

Napoleon was surprised to start with. He was unprepared for an attack. He never thought the Austrians, cut off from the lower Po but holding Genoa, would turn on him. He calculated on their moving southwards, and had sent off Desaix to seek them out. But he was wrong. Old Melas had a good deal of the Blücher in him, and his troops were full of fight. To shirk an engagement when the odds were fairly even was not his way. The Austrians came out from Alessandria, over the Bormida, and went for Lannes and Victor with a will, while the First Consul was still asleep in his quarters miles away. Gradually superior numbers told. The French retreated fighting. Marengo was lost. And Napoleon was fortunate in arriving before the retreat became a rout, and in having at the first alarm summoned Desaix back to his support at San Giuliano. The sight of him nerved the soldiers to fresh efforts, for they believed in him. His presence on the field staved off panic. Playing a losing game, the Frenchman is seldom at his best; but under Napoleon when still in full possession of his faculties, the volatile enthusiastic soldiery could be as undismayed and dogged in retreat as they ever were gay and dashing when victorious. So Napoleon fell back steadily and fighting, hoping for Desaix. And Melas, weary but triumphant, thinking the battle won, rode off back to Alessandria, leaving Zach to carry on and keep the French upon the move.

Napoleon's indomitable pluck did not desert him. Although his generals all declared the day was lost, he stuck to it that he would win, and kept his troops in line of battle, which the very open terrain admitted of. Zach came on, his advanced brigades keeping to the Marengo—San Giuliano road. At last Desaix arrived, riding on ahead of his division to meet his chief. Asked for his opinion, he gave it without hesitation. The battle, indeed, was lost, he said, but the day was yet young; there was still time to win another ere the sun went down. And he formed his leading battalions right across the road in a slight depression which one barely notices.

Napoleon meanwhile rode along the lines more to the left, calm and confident as the soldiers did not fail to note. "That will do," he called to them, "we've gone back far enough. You know I always sleep upon the battle-field." But though Zach was taken somewhat aback by finding Desaix drawn up in his path, he hurried to attack him, and a desperate fight ensued. Desaix was one of the first to fall. For some time the issue hung in the balance; the Austrians, flushed with their success, came on with much enthusiasm; the French, somewhat inferior in force, held their ground stubbornly. Gradually, however, Zach began to gain the mastery, and it seemed as if the second battle like the first would end in French defeat, when of a sudden there occurred incomparably the most dramatic tactical incident in the history of modern war.

From the left, from behind some vineyards—the same may be as those which still exist some little distance from the road—a mass of cavalry swept down upon the Austrians, totally unprepared for such an onset. It was a matter, not of minutes, but of seconds. Kellermann had with him only 600 sabres, the strength of an ordinary modern cavalry corps. But they were right among Zach's troops before an

attempt could be made to offer them resistance. It was a marvellous coup. 2000 Austrians laid down their arms. Zach was captured. The leading brigades of his army were utterly dispersed. Napoleon saw his opportunity and ordered an advance. The French swept the Austrians back like chaff across the Marengo plain into the Bormida. And Napoleon slept that night upon the battle-field, as he said he would, thanks to Kellermann. We can forgive him much, but we cannot forgive him his treatment of the cavalry leader who won the battle of Marengo for him, and thereby made him Emperor.

There is a hill, a league or so the other side of Gundamuk, and on its highest point a cairn of stones. Past its foot the road from Kabul to Peshawur runs, a rugged, rocky track. A highway this has been for ages leading down towards Hindustan. Alexander of Macedon came this way, and Tamerlane and many another Tartar conqueror long since forgotten. But the story of the hill is not forgotten, nor will it be.

On its broad, stony summit the remnants of the British garrison of Kabul, retreating to India, fought their last fight and left their bones some fifty years ago. All told, they barely numbered threescore souls, 44th officers and men mostly, with a few horse gunners. Ten days in the Afghan defiles in mid-winter, harrassed unceasingly by cut-throat Ghilzais and Pathans, had brought the British fighting force to this. The little band halted, it would seem, upon the road below parleying with the Afghans. Jellalabad was still distant 20 miles or more, and the only hope of reaching it lay in obtaining a safe conduct from the enemy. Akbar Khan had over and over again sent messages of friendliness, and from the treatment which the prisoners received, it seems not impossible that the Afghan Sirdars, whatever the tribesmen may have wished, hoped rather to capture and disarm the British force than to destroy it.

Smatterings of Oriental speech picked up by the soldier on the Indian plains do not go far confronted with an Afghan. Somehow a misunderstanding arose. It may have been all a mistake; it may have been deliberate treachery. Some inquisitive Pathan may merely have reached out his hand for a musket to have a look at it; an attempt may really have been made to carry out disarmament by force. Whatever was the cause of it, a sudden dispute ended in a *mêlee*. Fire was opened on the British from the hill. They charged and drove the Afghans off it with the bayonet. And then they formed a rallying square, hoping only to account for plenty of the enemy before the curtain dropped upon the tragedy.

They had not long to wait. The infuriated Afghans, swarming up the hill sides, hurled themselves upon the square. Ammunition, almost exhausted before this closing scrimmage, was all shot away. Then they fought with the cold steel, with stones and fists. It was a thrilling finish to the retreat from Kabul, this final stand upon the height near Gundamuk. With the exception of a very few—one an officer, who had the Regimental colour of the 44th wound round him—who were taken prisoners, all were slaughtered fighting to the end. What the future may have in store for us among these Afghan hills, who can tell? But it will bring forth nothing to be prouder of.

ON THE REVISION OF KANE'S LIST OF OFFICERS ROYAL ARTILLERY.

BY

LIEUT.-COLONEL J. C. DALTON (H.P.), R.A.

As one of the Sub-Committee appointed by the Committee R.A. Institution to consider the best means of editing and preparing for press the vast amount of information collected by General Askwith, R.A., for the revision of Kane's List of the Officers of the Regiment, it will, I think, be interesting to my brother officers to know what is being done in the matter.

As is already known, General Askwith has most kindly placed all his notes at the disposal of the Institution, and he is still hard at work completing and further elaborating them. The Sub-Committee having received a small "grant in aid" from the Committee of the Institution to meet current expenses, have engaged the services of a copying clerk, who is now at work making a fair copy from General Askwith's originals of all the notes which he has collected with regard to the officers whose names appear in Kane. We have drawn up a list of abbreviations, which will greatly shorten the amount to be printed and will ensure, as far as possible, uniformity in style. The original Kane's List numbers are to be held as sacred, and in cases where new names which have been accidentally omitted from Kane have to be interpolated, they will be given the number of the name immediately preceding their position on the Seniority list, and will be distinguished by letters *a*, *b*, *c*, &c. Thus, it will be quite safe when referring to officers of the Regiment for purposes of identification (as is done, I think, in our Photograph Albums in the R.A. Mess, Woolwich), to quote the Kane's List number, which has in fact become the officers' regimental number! The new Kane's List will eventually be in the same style as the present one, though possibly slightly larger; the columns containing dates of commissions will be brought up to date, and the information in the column of "Remarks" will be considerably amplified, thanks to the patriotic exertions of General Askwith and of some others who have assisted him with their notes. In addition to the biographical and other notes in the column of Remarks in the present Kane's List, there will be inserted in an abbreviated form each officer's colonial and war services, decorations and distinctions, and such staff appointments as he may have held. Thus, as can readily be seen, the new Kane will

form a most valuable record of the history and varied services of the officers of the Royal Regiment of Artillery from its formation up to the present date, and must be of great use hereafter to all who are interested in looking up military and family records. Of the more specially distinguished officers of the Regiment there will be, as before, more detailed biographical notices, and the book will contain other matters of interest, such as a table of relationship shewing the families who have contributed members to the Regiment, often for a succession of generations: also, as now, lists of the officers who have held the chief regimental appointments since their institution, lists of artillery trains, campaigns, and names of the officers commanding the artillery, lists of departmental officers connected with the Regiment, &c., &c.

In the course of next year the Committee hope to have the MSS. of the revised Kane's List ready for the printer, and they will then get an estimate of the cost of publication.

Owing to the large amount of additional matter and to the ever increasing number of names which have to be added, the expense of publication must necessarily be considerably greater than that of previous editions, but it is most devoutly to be hoped that when the time for printing comes near, the officers of the Regiment will freely come forward and subscribe for copies of the book and thus make the speedy production of the revised Kane's List a certainty.

In a Regiment such as ours, and with such traditions, there ought to be no difficulty in getting together a sufficient number of subscribers to ensure the publication of the book at a moderate price, and thus we shall be able to show an appreciation and just acknowledgment of the labour of love of General Askwith and those who have helped him towards the building up of a regimental record which, I venture to think, will be quite unique.

As I have already implied there is yet a lot of work to be done, and every day some fresh information comes in which is of value and has to be interpolated. General Askwith has had useful help from some of his contemporaries and other senior officers of the Regiment who, either themselves, or their fathers before them, have kept interesting records of facts as they happened.

The priceless mass of information recently presented by Sir Collingwood Dickson to the R.A. Institution, which was noted and recorded almost daily by his father, Sir Alexander Dickson and by himself, will, most certainly, tend to fill up many gaps in the records of officers' services; and some of the original journals kept by Artillery officers on active service, which are perfectly reliable, give interesting little items of news which clear up disputed or doubtful points. As an example of such a journal might be cited a short MS. diary now in the possession of Captain F. M. Lowe, R.A., which was kept by Captain James Wood, R.A. (No. 209 in Kane), and deals with an interesting period, viz.: 1756–1766. Capt. Wood served 10 years in India and was at the siege of Surat, 1759. Another valuable record is that of No. 1327, Captain William Swabey, R.A., who served at Waterloo and whose diary has been edited by the capable hand of Colonel F. A. Whinyates and is about to be published in the "Proceedings."

There must be more such records or diaries if they could only be got at, and I would suggest that an appeal be made to officers and others who may have acquired such, to acquaint the Secretary of the R.A. Institution in order that he may, with their permission, get a look at them and glean any useful notes therefrom for the present revision of Kane and for regimental records generally.

Later on, when we are further advanced with the MSS. of the revised Kane's List, I propose to repeat again how matters stand and, meanwhile, I can myself say on behalf of the Kane's List Committee, that they will be thankful for any item of information with which officers of the Regiment or others may be able to furnish them towards rendering the notes regarding the services of their regimental ancestors as complete and accurate as possible.

BRIEF CONSIDERATIONS ON COAST DEFENCE.

BY

MAJOR-GENERAL H. Le G. GEARY, C.B.

Did an enemy's division escape (through a blockade), the general policy was not invalidated by such occasional failure. The first line of defence had been pierced at a single point; there still remained the other lines, the fortified posts and the soldiers behind them. . . . .

A wisely co-ordinated system of defence does not contemplate that every point is to hold out indefinitely, but only for such time as may be necessary for it to receive the support which the other parts of the whole are intended to supply. That the navy is the first line of defence, both in order and importance, by no means implies that there is or should be no other. This forced and extravagant interpretation, for which naval officers have been largely responsible, of the true opinion that a navy is the best protection for a sea frontier, has very much to do with that faulty strategy which would tie the fleet, whatever its power, to the home ports. Navies do not dispense with fortifications nor with armies; but when wisely handled, they may save their country the strain which comes when these have to be called into play. . . . . This kindly office did British seamen for Great Britain in the days of Napoleon.[1]

"A fish out of water." "A swan on a turnpike road." "Every cobbler to his last."—*Proverbs.*

"A sea-captain defending a citadel, a general manœuvring a fleet."—*Corollary.*

Men-of-war carry three descriptions of armament, varying in weight and numbers, according to their size.

It is improbable that an attack would be made on a coast battery without at least one first class battle-ship being included in the attacking force, the broadside of which may be taken at four heavy B.L. guns, corresponding to our 67-ton guns; and six corresponding to our 6-in. B.L. guns; besides quick-firing and machine guns.

It is desirable that ships should not be allowed to close within 2000 yards of an open battery, on account of these last, which would otherwise inflict heavy loss to the gun detachments. Therefore, when natural obstacles such as shoals or reefs do not exist, obstacles should

[1] "The Influence of Sea Power upon the French Revolution." By Captain A. T. Mahan, U.S.N. Vol. I., chapter XI., p. 341.

be created. Perhaps there is no more suitable employment for mines.

It is obvious that the sites should be as high as possible, within reasonable limits; as the range will be longer at which it will be necessary for ships to engage with effect, and while the ship offers the greatest possible target the land battery affords the least. A shell, striking the face of a battery in a direction more ascending than nearly parallel to the terreplein, would be ineffective. A site of 100 feet above the sea-level would require to be attacked at a range of 1490 yards; one of 200 feet, at 2070 yards; of 300 feet, at 2530 yards. Hence, except where the heavier quick-firing guns are mounted and the risk must be incurred, guns, on all sites of less than 200 feet, should be mounted on disappearing mountings; and, on very low sites below 50 feet, these mountings are a necessity. Disappearing mountings neutralise the advantage of an enemy's quick-firing guns, which see no target except at the moment of firing. No water area, however limited, should be defended by one gun only.

Where sites are not less than 250 feet above the sea-level, it is unnecessary that the armament of the defenders should be equal that of the attacker, provided, that the guns are heavy enough to strike the enemy at his fighting range with effect. On lower sites, it is desirable that the armament should be equal to that of the enemy, at least.

If guns on low sites are not mounted on disappearing mountings in emplacements properly constructed, so as to be thoroughly protected against direct fire, the number of the defender's guns should be increased.

Assuming the minimum attacking force to be as indicated above, the number of guns to be opposed would vary from 20 to 30; and the defender should be able to concentrate the fire of an equal number upon any spot, from which an attack could be delivered. High-angle guns should be additional to this calculation, as they are only effective against ships at anchor, or, moving very slowly, or, in a very confined area.

Palliser shot is of little value against modern armour, and, unless *really* armour penetrating projectiles are supplied, common shell is the principal projectile to be employed. Shrapnel may be used against lightly-protected or unarmoured vessels. Time fuzes would be unsuitable.

The idea of attacking unarmoured portions of a vessel with one projectile, and, armoured with another, is illusory; except, when a ship is at rest at a short range, a contingency unlikely to occur.

The fire of heavy guns at night, without search-lights, will not be effective.

Small quick-firing guns and machine guns should not be too closely associated with heavy guns for the attack of an enemy. They should be placed in position by themselves. Their usual *rôle* is for the protection of mine-fields, of channels not more than 2000 yards wide, of shoal water, against torpedo-boats and light craft. They require protection against machine, and, light quick-firing guns.

Mine-fields are employed to block channels and approaches, and, could be most usefully employed, in preventing the approach of ships within 2000 yards of batteries. Mine-fields should be placed in close

association with the coast batteries, and not in separate positions, necessitating special protection. It is better to have one or two strong barriers, than to disseminate a defence over a large area, weak at every point.

Dirigible torpedoes are effective against single objects within a range of 2000 yards. In protecting channels and harbours at night against torpedo-boats, 12-pr. quick-firing guns should be employed, mounted but little above the sea level, at high water. Their trajectory for 2000 yards may be taken as flat; and their fire should therefore be directed from three to seven feet, above the water level. A sufficient number should be employed, so as thoroughly to sweep the area they are placed to protect. If mounted on a high site a quick-firing gun can only strike or miss one object and is useless against a resolute attack by a squadron; whereas, if mounted as described, the chances of hitting are largely increased. The essential condition is, however, flatness of trajectory.

No effective artillery fire can be expected at night without search-lights, as it is necessary to see clearly an enemy's water-line; excepting, where an enemy may run past at close ranges, for which guns may be laid point blank or for fixed distances, beforehand.

Fixed beams are useful for discovering the advance of an enemy; but, the high speed at which he would cross such a beam would not afford an opportunity for more than a passing shot.

Wider areas may be illuminated by divergent beams, but unless of sufficient and sustained power to thoroughly light up vessels, they are insufficient for Artillery purposes.

If an enemy is to be found at night and not allowed to escape observation till disposed of, search-lights are indispensable.

In the foregoing remarks an endeavour has been made to epitomize certain conclusions, and not the opinions of individuals. The reasoning upon which they rest will be readily supplied by the reader.

How far these, or indeed any conclusions, may be acted upon, is largely a question of money; but, a clear apprehension of the principles upon which the varying problem of coast defence can alone be solved, is within the power of all concerned.

"That there should one man die ignorant who had capacity for knowledge,—this I call a tragedy." *Carlyle.*

SHORT NOTES

ON THE

CARE OF THE TROOP HORSE:

FOR

YOUNG OFFICERS AND N.-C. OFFICERS.

BY

MAJOR J. HOTHAM, R.H.A.

As some ninety per cent. of both officers and men in the mounted branches join the service with almost absolutely no knowledge about horses, and as I have found, I regret to say, after many years experience, that officers and N.-C.O.'s of five and six years' service, and even much more, have the very vaguest ideas about conditioning, nursing, diagnosing sickness, etc. of horses, I have tried to put together a few notes to aid both young officers and young soldiers on joining, to acquire some little knowledge of their duties as horse-masters.

Although both officers and men, in these highly scientific days, are examined after lectures on musketry, gunnery, range-finding, and what not, but little attention, up to date, has been paid to teaching them to know something practical about the horse.

I am, at present, serving in one of the largest stations in India, where there happens to be a large force of cavalry and artillery, but I will undertake to state that there are not ten officers in the station who can shoe or age a horse, make and give a ball, or diagnose and treat a simple case of colic, distinguishing it from inflammation.

This, I think, is a very lamentable state of things, when you consider the number of horses there are in their charge, and that on service many of them—often a detachment—may be without a Veterinary-Surgeon or a Farrier-Sergeant.

But very little teaching and trouble would enable all officers to do these things and more, yet how few there are among them, who, although good soldiers and able horsemen, will take of their own accord the trouble to learn.

That this is so, is chiefly the fault of their early training, as I find that both officers and men are all really keen to learn.

When a young officer comes to my battery and he tells me he has passed the gunnery school, range-finding and, perhaps, signalling, although these qualifications are excellent in their way, they give me

absolutely no clue as to whether he is likely to be of much use; but if I find one that can shoe a horse as well as ride one, that can administer an enema, and mix a colic drink, I at once come to the conclusion that I have got a useful man.

I write of course taking into consideration that both the boys have been properly selected as fit for the R.H.A., which should mean that they possess all the best qualities a soldier can have.

Again, recruits on joining are taught to ride mechanically and, as a rule, to regard their horses as machines, which are steered and guided by aids and pressure of the legs and hands. They go through the regular course which has varied but little since I joined, the rough-riders make exactly the same remarks and the same old jokes, and the men are passed into the ranks as trained horsemen, knowing nothing whatever of the treatment or care of their mounts, for the reason that the rough-riders, from want of teaching, know but little about it themselves, and what they do know they are not as a rule called on or expected to impart to recruits.

If Commanding Officers would lecture to the officers, N.-C.O.'s, and all ranks at times on the horse, his points, his weaknesses, and how to treat him, I feel certain, and I speak from the experience of a Commanding Officer who has done so for some years, that both on service and on manœuvres, as well as in barracks, the horse would be much fitter, and that there would be fifty per cent. less small casualties when in the field or on the march.

I have always found all ranks take the greatest interest in such lectures, and I have noticed wonderful results almost at once in the stable management of the men.

I would have rough-riders so taught to vary their harangues on positions and aids, with a few simple hints on the care and management of horses, both in and out of stables; such as the points of the horse, the symptoms of sickness and lameness. The men will pick these things up very rapidly, and act on them. I have tried it with my own rough-riders for many years.

It is, I believe, and regret to say notorious that English soldiers are the worst horsemasters on service among European troops; this was, I am informed, most noticeable, both in the Peninsular and Crimean Campaigns. We, Englishmen, pride ourselves on our riding, so, surely, we should also pride ourselves on the care of, and turn out of our horses.

Treatment on the Field.

I would, in the first place, most strongly impress on all ranks, to try and treat your horses almost as you would treat yourselves, both as regards work and feeding.

Your horses are like boys, they have delicate stomachs, soft bones, and flabby sinews; a horse is not matured until six or seven years old. Now boys cannot stand the same amount of work as matured men, neither can a four-year-old work like an old horse, yet, how few soldiers realize this when mounted on four, or even five-year-olds.

I would urge on all to spare young horses in every way, take the weight off their backs whenever you can by dismounting, and never gallop over hard or through deep ground if possible. A few hard days on a young and immatured horse may ruin his constitution for ever;

remember this and treat him accordingly, and he will repay all the care when he matures.

How often have we seen orderlies needlessly galloping young horses through ploughed fields and down macadamised roads, also sitting on their horses' backs for an hour at a time, when they might dismount, and possibly feed; this all comes from the want of teaching, and is entirely the fault of the officers.

Condition.

Again, it should be borne in mind that horses, when not in regular work, soon get soft and out of condition, and their muscles and sinews relax. When in this state a sudden strain or rapid and long work quickly lame them. Horses that are fit and hard from regular, long and constant exercise, but rarely go lame or break down; thus, before going on manœuvres, on the march, or into strong work, horses should gradually be brought into hard condition. In India, after the long hot and wet season, it takes some time to recondition horses, so it does hunters at home, after a summer's rest. At home, during the winter months also, horses get a little soft, though now-a-days, what with short service and drafts for India, the troop horse in England gets but little change in his work, summer or winter (we work at high pressure in these times), at least in regiments and batteries commanded by men who wish to keep up to the mark.

A regimental football team would never think of entering for a cup, without long and constant training to get hard and supple, to strengthen the sinews and muscles and clear the wind; the same holds good with race-horses, and so it does, or should, with troop horses.

Short, quick work will not put on condition, but it may likely lame many horses.

It is the long, slow trotting and walking, some three to four hours a day, that hardens the sinews and puts on muscle, and this is the only real way to condition horses; when in hard working condition, horses will appear lighter than they really are, from the muscle standing out on the quarters and thighs, and from their stomachs running up a little; bad judges, and there are very many, will probably say your horses are looking too light, never heed them, but, remember the great art is to get them big and fit, long slow work will achieve this.

Above all, never start on a long march or manœuvres with soft, fat horses, otherwise you will soon have them poor and thin and bitterly regret it.

How often have many of us seen a battery coming into a station, after a month's march, with a lot of horses looking like rails tied up with bits of numnah and sheepskin.

Horse Artillery and cavalry horses should be able, when at work, to move five or six miles at a fast pace, and then gallop half-a-mile at the end without any great distress, this cannot be done without long and careful training, it might certainly be done on one day, but the result would be disastrous, and probably the horses would feel the effects for some days and there would be casualties.

Treatment in the Stable.

On the treatment in the stables depends the condition of the horses: careful watering and feeding, with regular and good grooming.

A horse's natural food is grass; all dry grains, such as oats,

barley, or gram, with which we feed our horses, are more or less artificial food to them; therefore, you should, with young horses, give grain at first in moderation, otherwise you will upset their stomachs. All grain should be crushed and mixed with chaff, to prevent horses bolting it, which many will do; you can easily trace those that do so by examining the droppings; some grains are more heating than others, gram is especially so; this is the staple food in India, it should at first be given in very small quantities and mixed with an equal weight of bran.

Oats are the best of all grains, next, I think, barley, especially if parched (roasted); this process counteracts the irritant effect which the husk has on the stomach. Indian corn, though not good alone, when mixed with a third of its weight of gram, answers very well; Cooltee requires boiling, and I don't like it myself, though it is used in Madras.

Forage. A pound or two of boiled barley in the evening's feed is an excellent thing for thin and backward horses, boil with but little water, and do not throw the water away. For bad doers and horses that are thin and hidebound, or otherwise in poor condition, 1 lb. of linseed boiled, with the evening's feed, will, after a month or so, often bring about a marvellous change; if you cannot manage to boil the linseed then buy a barrel of linseed oil from some cake-makers, and give 4 ozs. a day in the food, two in the morning and two in the evening, for some time. At home I recommend always having a barrel on hand. In India I have often used the refuse linseed, after it has been crushed, with success, you can buy it in the bazaar, the natives use it for their cows. Every horse should have from 1 to 2 ozs. of salt daily, and if possible also a piece in the manger to lick. Black pepper mixed in the food is an excellent stomachic, as also is turmeric. The latter is very useful in cases of indigestion, give one tablespoon full in each feed. As young horses cannot go so long on empty stomachs as old ones, try and feed them oftener.

A good alterative condition powder is as follows: two parts sulphur, two parts epsom salts, and one part black antimony, give a couple of tablespoons full for five or six days in the evening food.

Some horses, like men, suffer from indigestion very much, and others soon get liverish if they get too much corn. In the latter case, stop all corn, give green food liberally, and a good drench of 12 ozs. of epsom salts, followed by 4 ozs. linseed oil, to move the bowels. They will probably get all right in a few days, if fever sets in they may give trouble and be very wrong for some time.

Teeth. Horses that do not masticate their food may be suffering from sharp or bad teeth; always have them examined and, if sharp, filed, I attribute a good deal of bad condition to bad teeth. Some horses will, however, do what you will, always look bad, bad constitutioned horses; it may be hereditary and it may be from being overworked, as four or five-year-olds, before they were fit; if you look up many of these in the horse-book you can often trace the date of their ruin to some camp of exercise, or long march, during their first season. Also there are good horses that never carry flesh from a nervous temperament, as there are men that do the same; some inspecting officers appear unable to

grasp this, and to think that all horses should be round, I have several times felt inclined to point out to a somewhat thin inspecting officer, who I have heard make that remark, that, although a good trencherman himself, he did but little credit to his food.

Hay and Grass.

On the quality of the hay and grass as much depends as on the quality of the corn, however much corn a horse gets, he must have good hay to keep in condition. All officers should study a little the different grasses, both at home and in India, and should endeavour never to pass in any that is really bad. Most indifferent stuff is constantly brought up to be passed at home.

I think we are far too careless, as a rule, about hay and grass. In India, where green grass is issued or supplied, it should be dried for a day before being given, and for two or three hours before it is weighed in; 100 lbs. of green grass will, when dry, not weigh 35 lbs.

Lowland grass is very bad for horses and should, if possible, not be taken. In India doub grass is the best of all grasses if not collected from dirty nullahs, as it often is in the hot weather. The grass farms in India have of late years begun to supply excellent hay.

Oats.

Black oats, of an equal weight with white ones are far superior, the husk is much thinner and they grind a very great deal more meal, a black oat of 40 lbs. the bushel is better than a white oat at 43 lbs. I have known officers, from ignorance, refuse black oats often. Ask the livery stablemen, and coaching men what they think of good black English and Riga oats? A team of horses fed on black oats will kill a team fed on white ones of equal weight, if it comes to hard work; still white oats are more fashionable, from the colour I suppose. Indian oats are very light, but are good feeding, I once fed my whole battery on them for three months, and the horses improved a great deal.

Bran mash.

All horses should have a bran mash once a week at least, the bran should be scalded in a bucket, with a cover on the bucket, for a quarter-of-an-hour, a very little boiling water is necessary; if you can manage it, add a little boiled linseed for your thin ones. Bran mashes are generally made in stable barrows with cold water. Never send a horse out on a long day on an empty stomach, horses are naturally very empty in the morning, nothing will knock them up quicker; try it yourself. A half feed of 2 lbs. of corn in the morning will keep them going, as a cup of tea and a biscuit keeps a soldier going. In India, remember, that unless officers, N.-C.O.'s and men are not all very careful, the horse will probably get but half his ration at most, and the rest of it will go, probably, to the cowmen in the nearest village. Syces are so badly paid that but few can be trusted, and really owing to the very extensive system of bribery and corruption in India it is hard to trust anyone. You cannot be too careful in checking weights, weighing all yourself, and measuring horses feeds. When once issued to troop-stables and the sergeants and Nos. 1 have seen the corn weighed, it should be kept under lock and key, and the men should not leave stables until the feeds are eaten.

Watering.

Watering is but too often hurriedly carried out, especially in very cold weather at home and very hot weather in India. A good and copious supply of water is almost a greater help to condition than good

feeding; a horse's condition will vary very much, not only from the quantity but the quality of the water he gets to drink, I may quote the wonderful tonic effect of the Aldershot water, also I can mention a case when I soldiered at Limerick in 1872: one stable watered at a soft water (rain water) trough, the other five at a well. The horses watered with rain water were always in much the best condition and we changed the horses to try.

A native of India always talks about change of water and not change of air, and depend on it in his case as a water drinker, water has more to do with the change than the air, and so it is with a horse.

If possible there should be water at all times in every horse's stall, this cannot be so easily managed in England, although zinc buckets are cheap, but in India it is generally the case now-a-days; it should be constantly changed and the buckets or chatties cleaned out daily. During hot weather, both at home and abroad, when horses have no water in their stalls, they should be watered the last thing in the evening, say at 8.30.

Grooming. However carefully you feed and water your horses, they will never look well without lots of good grooming. To groom a horse properly means hard work, and but few soldiers have the knack of grooming well. If you want to see horses groomed and learn how it is done, go into some coaching or big hunting stable and watch a helper on a pound a week, turn over a couple of horses, he does it in about half the time that a trooper does one. It is a knack and has to be learned and it makes a man sweat, but the result is marvellous.

A celebrated judge of hunters at Islington quite lately asked an old exhibitor of many prize winners what he gave his horses to make their coats look so well. The only answer the old man gave was "elbow grease." Unless you are very strict in troop-stables, you do not get half enough "elbow grease," and the coarse-bred horse takes a deal to make him shine, especially when unclipped.

Wisping. In cold and damp weather, wisps should be used half-an-hour at evening stable hour, if used properly you should hear the rattle half-a-mile off. Wisping promotes circulation and keeps the horse's skin healthy, mane combs should only be used sparingly and by those who understand them and from underneath only.

Trimming. Manes and tails should be carefully brushed out at every stable hour. I recommend having one stable hour a week in the evening for trimming up all round—manes, tails, fetlocks, beards, etc., with scissors and machines. Tails, through the whole battery, should be cut by one man, otherwise they will be uneven. Tail cutting is a great art and requires very great care.

If you come into stables and turn out before you have time to thoroughly dry the legs, put on hay bandages (I always kept them ready at home), you will very often avoid cracked heels and chills by so doing; when the men turn in again, the bandages are taken off and the dry mud brushed off; never on any account in cold weather wash horses legs after work.

Clipping. All horses should be clipped when their coats grow, and if clipped fairly early they will not feel the cold. Horses really suffer but little

from dry cold, though much from wet cold. If, as in England, you do not get supplied with rugs (though I would recommend trying to do so somehow), clip as high as the saddle flap or trace line, and shade off with a singeing lamp well up the sides and flanks, this will answer very well. I did so for some years and really left but little coats at all (if you are careful with the lamp it shows but very little), and the horses kept in excellent condition. No horses can do their work properly and be clean and well turned out that are left with their coats on, besides it breaks the hearts of the men who have to groom them. More than half the colds and coughs are caught from undried legs and bellies, and from horses breaking out again and the sweat in the long hair laying cold on them. Now that all sensible men clip and singe as far as possible, colds are but rare, but you must leave the doors and windows open, never mind the coats staring a bit, the horses will be healthy; if, however, doors and ventilators are closed and stopped up with straw, the horses when they go out and stand about feel the change and will suffer. An airy and cold stable is the best preventative against any epidemic of colds, or influenza. A hot and close stable will breed any disease. All grooms and soldiers like hot stables.

In concluding my remarks on grooming and stables, I must again draw attention to the unfailing receipt for good condition, viz. "elbow grease."

Skin Diseases.

All horses are liable at times to surfeits, spots and, in India, to prickly heat. For ordinary surfeits and spots, a few days of soft food, no corn, and 4 ozs. of epsom salts a day, for a week, will generally answer.

An excellent alterative is two parts sulphur, two parts epsom salts, and one part black antimony; two tablespoon fulls evening feed for ten days or so.

Prickly Heat.

Prickly heat is a most troublesome disease to deal with, it generally breaks out about the middle of May and lasts till October.

Horses get very itchy and fall away rapidly in condition, and unless tied up and care be taken, will rub themselves raw in many places, especially about the manes and tails.

Nearly every remedy has been tried, and though many men have specifics, none appear to do very much good, especially with horses that have apparently got it into the system. I tried to cure myself of prickly heat for six weeks and failed.

Personally I recommend: a liberal diet, avoiding gram and heating grain, substituting linseed and oats; keep the skin acting well and give a course of alterative powders as above.

As external dressing I have seen every sort of thing tried, one appears to suit one case, another another.

1 oz. of sulphur mixed in a wine bottle of linseed oil in fresh cases, and sometimes in old cases, appears about the best. Dress one day with this, the next day wash all over with soap and water. Dress again the third day, and so on.

If there be raw places dress them and the manes and tails, with a mild solution of prussic acid and lead lotion, this allays irritation and heals up the raws.

I use tail-bags made of rough canvas for bad cases. Green food, especially lucerne grass, is supposed by many to aggravate this disease and to bring it out. I cannot say, personally, that I have found much difference or benefit from feeding entirely on dry food, though I have heard doctors say that salads, and especially lettuce, often produce rashes and heat spots.

Symptoms of Sickness.

If cases of sickness be detected and treated at once, what would in a few days, if neglected, be bad cases, may often be checked and cured very quickly; it should be impressed on every one to report at once all cases of dullness, horses off their feed, colds, and similar small ailments.

If a horse be sluggish and dull in the field, or off its feed in stables, it is probably sickening for something; a good man will find out very quickly if his horse be dull, will ride him quietly and report to his superiors at once, but how often, from want of teaching, do soldiers, when they find their horses dull and off, spur them the more, bring them in and tie them up, and think or say nothing about it.

The great difficulty in diagnosing a horse's ailment is that, as he cannot speak and tell us where he feels the pain or how he feels, we have nothing to go on but outward visible symptoms and his temperature.

There are, however, certain symptoms and guides to sickness that all can notice, and that require no talent to learn.

The temperature of the mouth will give you a certain sign of fever or inflammation; with but little experience or practice, by placing his fingers in his horse's mouth, every man can learn to detect any increase of heat or change of temperature. Increase of heat denotes fever of some sort, or inflammation.

The mucous membrane: the lining of the nostrils, lips, and inside of the eyelids, is also a certain guide. Any extra redness or change of colouring denotes that something is amiss; if yellow, biliousness or liver out of order; if white, want of tone or weakness; if red and inflamed, fever, cold or inflammation of some sort.

The white of the eyes will show liver symptoms also by assuming a yellow tinge.

The urine, by its colour, also helps you to know if anything be wrong; the droppings of a horse should be solid and friable, not slimy, and should have no offensive smell when in health, though, when fed on some foods, Indian corn for one, this is not always the case.

Colds and sore throats.

Coughs, colds, and sore throats of course show themselves, these above everything should be taken in time, two or three days rest and soft food, steaming the head well with hot hay in a nose-bag, two or three times a day, will often check a cold coming on. A little mustard and water about as thick as bran, rubbed into the throat and gullet well, and then washed carefully off after 15 minutes, will go far to check a sore throat or cough, a little nitre in the wash to act on the skin and kidneys will assist. In case of any horse having a nasty slimy running at the nose, remove at once and isolate, it may be a case for a Veterinary-Surgeon, it may be nothing, but don't risk it, glanders are easily picked up in camps and billets in India from ponies or donkeys.

Lameness.

It is generally simple enough to see when a horse is lame, although at

least fifty per cent. of ordinary people will, when a horse is lame in front, fix the lameness on the wrong leg, but it is not so easy to find the cause of lameness in many cases.

A horse lame in front will, when trotted, drop his head to the side of the *sound* leg, most beginners think the lame leg. Lameness behind may generally be detected by trotting the horse directly away and watching the carriage of the hips.

When you have fixed on the leg, and you have neither heat or swelling to guide you and show you where the injury is, examine at once the foot most carefully, especially if lame in front. If the horse has been shod but a few days, in five cases out of ten the lameness arises from the shoeing, a tight shoe, a nail driven into or too near the sensitive foot, or a too free use of the knife. Take the shoe off, and try with pincers all round to see if and where the animal flinches; if there be heat in the foot and pain on pressure, put the foot in a bucket of hot water for an hour or so; if you find that the horse has been pricked, open out the nail hole to allow any pus to escape. Search also for corns at the same time, have them cut out, many horses are subject to them. You will probably be able to re-shoe the same day or the next; if the sole has been thinned by the knife or bruised, it would be wise to use a leather sole for a few days when in the field; if in barracks, you could afford to leave the horse in without a shoe for a day or two. Farriers and shoeing-smiths will never acknowledge that a horse has been injured shoeing, and will try to make you believe that the lameness is in the shoulder or elsewhere, do not listen to them. Of course, the lameness may arise from many other causes that are hard to detect at once, ringbone, sidebone, navicular, etc., all of which diseases are common, especially among draught horses. Ringbone is a bony deposit round one of the joints of the pastern, and may often be detected by feeling and comparing the joints; navicular you may suspect if the feet be uneven, and if at first the lameness is intermittent; navicular cases generally also point the toe of the lame foot in stable.

Spavin. If a horse is lame behind and there is nothing to give a clue, in the way of swelling or heat, to a kick, a strain, or a rope gall, the lameness is most probably in the hocks and arises from spavin. Curbs are more rare and noticeable, as the swelling shows itself below the point of the hock behind. Many horses are more or less spavined, especially Arabs, but these spavins are not always noticeable, as the unevenness of the hocks is often too small for the casual observer to see, a horse that is spavined carries its hock stiffly and cannot move it freely, therefore if you notice that the horse drags its toes or toe, and wears its shoes at the toe, it will often be a sign of spavin. You cannot cure, rest and hot fomentations may alleviate.

Sprains. For ordinary bruises, slight sprains, or blows, hot fomentations should be at once applied, two or three times a day, one to two hours at a time. The ordinary fomentations in troop stables last about ten minutes and are useless, between times wrap a woollen bandage loosely round the limb.

There is but one cure for sprains and that is rest; fomentations, blisters and embrocations, only assist the cure. Massage is a most

useful remedy in all such cases, and I have found it excellent in cases of sprains.

Cracked Heels.

Cracked heels give trouble at times, they come from draughts in stables on badly dried heels, and rarely happen when horses are picketed out; they should be kept clean and fomented, then dried up with a little astringent lotion, ointments are greasy and pick up dust. If the cracks become inflamed and appear greasy, poultice for two or three nights to get out the inflammation, and then dress. A carrot poultice is the best for this, carrots are very soothing. Treat rope galls in the same way. Grease in general means neglect and dirt.

Sore Backs.

Sore backs should but very rarely occur with the present saddles and blankets; in India, syces exercising horses will give them sore backs from riding bare back. This should not be allowed, they should always be made to fold a blanket in four, or use the numnahs.

If saddles be properly fitted and valise properly packed, or kits rolled and put in an arch and not flat, the centre straps being well taken up, sore backs can but very rarely occur.

Fitting Saddles.

Sore withers may occur if saddles are badly fitted, and saddle fitting is, as a rule, not properly carried out. To fit a saddle the rider must be mounted in the saddle, the officer fitting the saddle should stand in front, and the horse's fore legs should be brought forward with the knees bent one after the other. The hand should then be passed under the front of the side bars of the saddle and gullet to feel if there be any great pressure; if there be, change the saddle, for this pressure, if on the withers, will give a sore wither, if at the points of the shoulders, will check the action of the shoulders and cause the horse to fall. Horses will change very much in a year at the withers, and all saddles should be refitted yearly or half-yearly; saddles are issued of different sizes at the gullet.

Girth galls, except in the case of horses malformed, or with very round ribs like Arabs, will rarely occur when horses are fit and in good condition, but often when they are soft.

Girths.

No horse can, as a rule, be properly girthed up in the stable when the saddle is first put on, added to which all horses empty themselves when they first come out, therefore all girths should be re-adjusted after the first 10 or 15 minutes drill or march. Leather girths should be systematically dubbed every fortnight, and a few cape girths should be carried in every troop, to be used when necessary; when the cape girths are used don't forget to leave off the surcingle, or the remedy will be worse than the ill.

Collar Galls and Harness Chafes.

Collar galls and harness galls will not often give trouble if horses be hard and fit. A few pads of different sizes, with ties attached, should be carried always ready. If at every halt all horses are really well examined, but few bad galls can happen, and all ranks should see to this.

Harness should be kept as soft and pliable as possible, nose-bags, shoe pockets, and T bits are very liable to rub, but by taking up or letting out a hole at the halt you can easily save the chafe before any great damage is done; neither on service would you probably carry nose-bags or T bits rolled.

On the march and on service every small casualty must be looked to at once, for you cannot afford to lay horses up. Fullers earth is a capital dressing for small chafes. When saddles are taken off in camp I strongly recommend the backs to be well dried and then sharply wisped for 10 minutes with the palms of the hands, this prevents heat lumps rising; if they do come, salt or vinegar and water may be applied. You will see this beating with the palms of the hands done in the French cavalry, I believe.

Shoeing.

The chief points to observe in shoeing, for a man who has not studied it, are :—

The foot should be at about an angle of 45 degrees to the ground or face of the shoe (with flat and bad feet this cannot be). The shoe should fit the hoof exactly, there should be no dumping, rasping and hammering the toe to fit the shoe, giving it a round and worn appearance. The inner cage of the shoe should not press on the frog at the heels. The sole and frog should be left untouched by the knife, except as far as trimming off rough and ragged bits of the frog. The nails should come out evenly all round. The clenches should be well turned and there should be no rasping outside the hoof. The knife should be but little used; in fact, but few shoeing-smiths are to be trusted with a knife.

In conclusion, I should strongly urge on all young officers to learn to shoe roughly, and to go and study at the forge and pharmacy three or four hours a week for three months. In that time they would learn to treat simple cases, to give drenches, make balls, also all the rudiments of nursing. Every officer should be able to use the thermometer, to back-rake a horse and give an enema, and treat colds, coughs, livers, and all simple cases of sickness. They should know the secret of lameness and be able to distinguish one class of lameness from another. The Veterinary-Surgeon in charge will always be delighted to help them in every way. There are lots of excellent books on treatment, and if they do not want to dip too deeply into the subject, the notes that I, myself, wrote in the Institution papers, when a Subaltern in 1878, will meet the case.

There may be many occasions during every officer's service, when he will find himself detached without a Veterinary-Surgeon or even a farrier, and then a rough knowledge of medicines and treatment will be more than useful. I would impress on all ranks to treat the horse, not as a machine, but as a friend, both in riding him on the field and in dealing with him in the stable. He will thoroughly repay every little care and kindness. It is almost impossible not to grow fond of a good horse (of course there are bad horses and bad men), and the longer and more you live with horses the more you learn to like them. When I look back for the last 25 years of my life on the friends I have made and lost, a black mare and a chestnut horse come before my memory as almost two of the dearest.

EMPLOYMENT OF [1]GROUND SCOUTS, [1]COMBAT PATROLS, & ORDERLIES OF ARTILLERY.

COMPILED FROM

(*a*) "Russian Artillery Journal."
(*b*) "Revue d'Artillerie."
(*c*) "Taschenbach fur die Feld Artillerie."
(*d*) And Notes on ditto by Captain Wernigk.

BY

MAJOR E. A. LAMBART, R.A.

Introductory Note.

In connection with the subjects of this paper I would draw the attention of officers to the remarks and suggestions on the same points in the Prize Essays of this year.—*E.A.L.*

COMBAT PATROLS ("ZIELAUFKLÄRER").

The Regulations of the German Field Artillery of 1889 lay stress in several places on the necessity of reconnoitring for artillery, but principally with reference to operations at a distance from the enemy's position. The Regulations of 1892, a development of the former, enjoin on the Brigade-division Commander to supplement his own reconnaissance by endeavouring to obtain information of the distribution of the enemy's batteries. The instructions as regards the choice of the target are, however, rather curtailed :—

"Every artillery position should be reconnoitred from the point of view of the importance of the target.

In this connection 'combat patrols' may often be usefully employed. The Brigade-division Commander himself must always be in touch with the fire-action, in order at the right time to concentrate or distribute the fire of his batteries.

Auxiliary observers and scouts, with whom should be associated as many connecting orderlies as possible, may render useful service by giving information where the projectiles are falling and their effect on the enemy." (German Regulations). Captain Wernigk's work points out how the very compressed German Regulations should be understood.

[1] I have used the English terms, though, as will be seen, the duties do not exactly correspond. —*E.A.L.*

With smokeless powder this reconnoitring of the target becomes very important, and the more so, the better the target is concealed by skilful choice and occupation of the position by the enemy. This reconnaissance of the target is carried out in the first instance by Brigade-division and Battery Commanders from the position they propose to occupy, and then by auxiliary scouts in the vicinity, as far as possible, of the target.

In addition to the information obtainable from the use of good binoculars, it is often possible to solve doubts regarding the distribution of the enemy's artillery on the position, and the number of batteries or guns in action, by sending an officer to reconnoitre, accompanied by orderlies to carry messages. These "combat patrols" as they approach the enemy should endeavour to spy out his position, by selecting either in front or on a flank, points from which they can see him clearly.

This is a difficult and dangerous duty, as it is necessary to operate within the sphere of the enemy's fire and as close as possible to him, and, besides, the patrols run the risk of falling at any moment into the hands of the enemy's cavalry scouts. As on this duty it is often necessary to travel considerable distances, the fastest and strongest horses should be selected.

Duty of "Combat Patrols" Before Reaching Points of Observation.

The patrols should be well provided with everything useful for their task, such as maps, good glasses, note-books, compass, watch.

As a rule, the patrol accompanies the Brigade-division Commander in his reconnaissance of the position, but leaves him before the batteries come into action.

It is particularly necessary that the enemy's position *as it appeared to the Brigade-division Commander*, should be imprinted on the memory of the scouting officer.

If he knows exactly the details of the enemy's position on which the Commander requires enlightenment, the information he procures will gain greatly in exactitude, as he can describe the position by reference to certain points, such as trees, woods, etc., previously remarked by him and the Brigade-division Commander. He must personally acquaint himself with the locality. As far as is consistent with obtaining the information required as to the features of the position and the disposition of the enemy's troops, he should move about in every direction with his orderlies. As a rule, it is better for him to keep close to his own cavalry so as, under cover of them, to find a good point of observation. He should gain this point as quickly as possible without being observed, losing no opportunity of taking note of the enemy as he goes, and as soon as he has occupied it, should send an orderly with information to his Brigade-division Commander by the safest and shortest way.

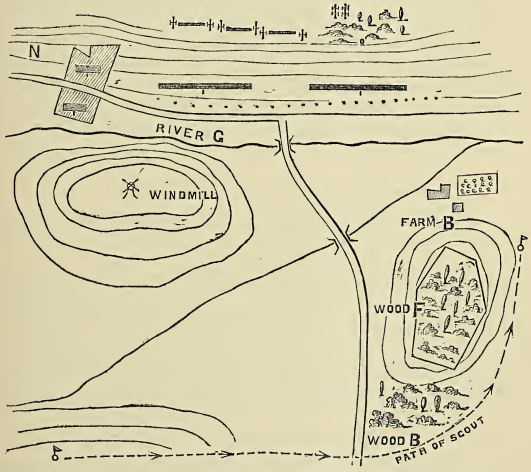
What Information to Send.

First of all he should send information to the Brigade-division Commander as to the extent of front occupied by the enemy's artillery, together with the number of batteries and guns. He should report, if

possible, in addition, how far and how the guns are concealed, the position of fences, etc., and the formation, whether in line or échelon, etc.

The information should be of two kinds, the one to assist the ranging as regards direction, the other as regards range. This latter, if obtainable, is easily put into shape so that the Brigade-division Commander can benefit by it, but the former is much harder. It is very difficult to describe the direction of the enemy and the width of his front. Of course, if the position contains any strongly-defined objects, such as a wood or a mill, etc., the officer can easily report to the Brigade-division Commander the position of both flanks, but it is not to be expected that the enemy, as a rule, would occupy such a position. Reference to the map may, however, often give him valuable assistance, and if he can identify the position of the enemy clearly in this way, his report will at once furnish the required range.

To avoid confusion, his report should be accompanied by a rough sketch, and the orderly should be informed of the nature of the report, with an explanation of the sketch, so that he may himself be able, if necessary, to give further details to the Brigade-division Commander. The subjoined example shows the sort of information the Germans require from "combat patrols:"—



Report.

Sent by. Combat Patrol 1st Brigade-division.

Place of Sender. Edge of wood "F," to the south of Farm "B," 9 a.m.

To. Officer Commanding 1st Brigade-division, Field Artillery.

"A Brigade-division of three batteries of the enemy is on the slopes

of the heights to the right of 'N' behind the river 'G.' The batteries are in échelon, about 700 yards from the windmill. The limbers are in column behind the trees on the right of the batteries. The town 'N' and all the valley of 'G' are occupied by infantry." [1]

Report on the Nature of the Ground near the Target.

Ranging with percussion projectiles may become very difficult, and even impossible, on account of the ground in front of the target. If they fall on the marshy bank of a river, or even on soft ground, they give no burst, and if they fall on a very steep slope, the burst is hardly visible. It is, therefore, very important that the combat patrol should add some information as to the nature of the ground.

Referring to the example, the Report goes on :—

"In front of the enemy's position is a ravine 500 yards wide, with a marshy stream at the bottom. On the sides of the ravine there are trees and hedges, rendering difficult the observation of what is happening at the guns. The windmill is on the highest point of the slope in front of the enemy's position."

Observation of the Fire.

As a rule, the patrol can only observe the general results of the fire. He can only observe errors of range, as from his position on the flank, he cannot judge errors of direction until the projectiles begin to fall close to the target. He should always try to distinguish the fire of the different batteries (of his own side), so as to enable the Brigade-division Commander, if the ranges found by his batteries differ, to choose the right one for them. For example, he may report as follows :—

Report.

Sent by. Combat Patrol 1st Brigade-division.

Place of Sender. Edge of wood "F" to the south of Farm "B,"

9.30 a.m.

To. Officer Commanding 1st Brigade-division, Field Artillery.

"Most of our shells are falling on the height where the windmill stands, or on the enemy's side of it. The shells falling into the ravine are all blind. None of them have yet fallen near the target. The range seems short, about 600 yards as regards the right battery. It is probable that the shells falling into the ravine are being judged 'over.'"

Report of the Enemy's Movements.

The patrol should inform the Commander of every change in the dispositions of the enemy. For example :—

10.45 a.m. "Strong infantry columns are showing on the right of the little wood, behind which the limbers are standing," *or* "the limbers, concealed on the right flank, are beginning to move." He should be

[1] It would seem an improvement if the compass bearing of a point in the enemy's line of guns were added by the patrol from its position.—*E.A.L.*

especially careful not to miss any signs of a change of position, so as to give the batteries early notice of a change of target, thus :—

11.15 a.m. "Single scouts are reconnoitring the crest on the right of the little wood." This information enables the batteries to meet the enemy coming into position with ranged fire.

GROUND SCOUTS. ("Gelaude Aufklarer").

"All the ground in advance ought (German Regulations) to be reconnoitred, both as regards the enemy and as regards its passability. Although in principle, the former of these duties belongs rather to the other arms, artillery must, nevertheless, defend itself against sudden attack. As regards the latter, it is purely the business of the artillery.

The scouts detailed for this duty must maintain constant communication with the Brigade-division or Battery Commander; they must instantly report to him anything important that they observe, even if it does not relate to their special task."

These are known as "ground scouts," in contradistinction to "combat patrols."

Their duty is not only to secure the safety of the batteries when moving, and to find out if the ground is suitable, but also to select roads screened from view of the enemy.

When the batteries are in position, the scouts must watch for their safety against sudden attacks, because artillery, independently of its protection by other arms, must always guard itself against surprise. This is particularly necessary when a battery is detached on the exposed flank to guard that point. Ground scouts may be under-officers, trumpeters, one-year volunteers, *or in exceptional cases,* Nos. 1.

Training of Ground Scouts.

The instruction of "Ground Scouts" is commenced with their duties during movements, and in action. Afterwards they must be taught reconnaissance of ground, map reading and sketching.

The principal formations of troops of all three arms must be explained to them with their designations, and how to distinguish them and calculate their numbers at a distance. They should then be taken out into the field mounted, and taught how to acquaint themselves with all the topographical details which are likely to be of interest to artillery; they should learn to direct their attention to the existence of large and small bridges, fords, and the soil, in case it is necessary to move away from roads. They should be shewn how to pass obstacles, such as ditches, streams, railway embankments, how to facilitate passage across them, or, if necessary, how to circumvent them; besides this they must be taught what is more difficult—to execute sketches representing what they see. The instructor must always make sure that the sketches are genuine and not copies of the map, pointing out to them that a hand sketch will very often serve as an amplification and explanation, whereas a mere copy of the map is a waste of time and may often lead to mistaken conclusions.

The scouts must learn to choose for the advance of the batteries into position, roads under cover, and, for themselves, good points of observation from which they can give the Brigade-division or Battery Commander useful information; also how to benefit by the map on the spot, in reporting on paper, points observed by them in the vicinity, or in fixing the position of roads, streams, and wood visible to them.

By constant comparison of the ground with its representation on the map, they will cultivate the sense of locality, and in the course of a little time will be able to form for themselves a general idea of the features of the ground beyond their reach. As, however, on service the scouts, for the most part, will not be furnished with maps, it is important to teach them to do without them; they should, therefore, be practised in proceeding to certain points, being only given the direction and distance. This is only possible for short distances; if the scouts are to be sent far away, the instructor should shew them on the map all the country which they have to pass through, the road by which they are to go and their destination, the names of the streams, woods, and villages which they must pass through—these should be written down —or the scouts should be made to take a rapid sketch of their route.

Example.—"Start from here, point "M" on the north-western slope of Mont-Valerien to Rueil by the western road. From the high road on which the tram-rails run, turn to the right by the road to the bridge at Chaton; examine this bridge, as well as the road from it to Nauterre. From the bridge proceed to the signal station at "C" in a north-western direction, examine both the roads from Chaton to Carrier, one of which goes up to the height, and the other down to the Seine. The distance to the bridge is about 4 miles, and from the bridge to the signal station 2½ miles. Make a sketch, with the help of the map, so as to know at any moment where you are. Start in 5 minutes."

The scout makes the sketch with a pencil, marking the road with a simple line and dwelling-houses and other details by the conventional signs, noting the principal distances and marking the roads which he is *not* to take with a *negative*.

On his return the scout reports verbally what he has seen, only presenting a sketch if especially ordered.

Scouts should be good riders, with an eye for country. They should have good eyesight and be accustomed to take in the ground they are moving over at any pace. They ought to have field-glasses, and, if necessary, carry entrenching tools.

The Duties of Ground Scouts.

As a rule each battery sends out two "Ground Scouts," but if they are provided with entrenching tools, a third man should accompany them as horse-holder. On open ground, both the scouts go together, but when under cover, one of them with the horse-holder carries out reconnaissance, and the other maintains the connection with the battery, which must never be broken. Having received their orders as to direction from the Brigade-division or Battery Commander, the scouts at once go on ahead a certain distance, which they always maintain, so as to have time to examine obstacles, and, if possible, im-

prove the road or warn the batteries in case a change of direction is necessary to circumvent the obstacle. In order to avoid constantly riding backwards and forwards, they should communicate with the batteries by the authorised signals, informing them whether to halt, alter the pace or change the direction. The position of the scouts or horse-holder at an obstacle indicates the place of passage and the direction of movement.

The scouts, if they notice in the neighbourhood infantry or cavalry whose proximity is dangerous, must at once gallop in and inform the Brigade-division or Battery Commander. As in most cases artillery moves by roads, the examination of these latter constitutes the chief work of the scouts.

It is important that the scouts should not only take account of their passability, but also of whether they are wide enough in view of batteries having suddenly to come into action.

The scouts must direct themselves on houses, belfries, windmills, &c. This is especially necessary in woody country where it is often very hard to maintain direction; besides, scouts should rely rather on what is shown in the map than on information given by the local inhabitants.

When taking up position, artillery leaves the road and moves across country, taking advantage of cover as much as possible. At this time the Brigade-division or Battery Commander, with the scouts, goes forward to reconnoitre the position.

The scouts should benefit by their double journey, *i.e.* with the Commander and back again, to carefully inspect the ground and the obstacles which the battery or batteries will have to meet. They will thus be able to choose a road to the position without premature exposure, and avoiding obstacles; of these latter, only bogs, banks, vineyards, rivers and ditches in which the water is more than three feet deep need be considered impassable.

Duty of Ground Scouts in Action.

It is important not to draw the attention of the enemy prematurely to the position about to be occupied. The preliminary reconnaissance of the position should, therefore, be carried out on foot, the horses being left under cover. The appearance on the crest of a considerable number of horsemen would give warning to the enemy, and the batteries would be met by a fire already ranged. The scouts should, therefore, carefully avoid shewing themselves on the crest, and should make their observations from behind hedges, etc.

When the batteries come into action, the scouts should occupy themselves with protective duty on the front and flanks, and not too far away for them to communicate quickly with the Brigade-division Commander. They should choose points of observation with the greatest possible command of the front and flank concealed from the enemy. Both before and after the opening of fire, they should avoid indicating the position of the batteries to the enemy, and they should, therefore, when in view of the enemy, never move direct on the batteries.

The scouts are answerable for every attack of which they have not

given warning; they should be especially on the look-out for flank attacks, which cavalry very easily carry out by taking advantage of almost imperceptible undulations of the ground. They should give notice of all that takes place near the batteries, especially of the approach of fresh hostile troops at any distance, or in any direction; in the same way they give notice of the advance or retreat of their own troops.

In all these cases they must not trust to signals, which may escape the notice of the batteries. As a rule they should avoid disturbing the Battery Commanders unnecessarily, but must not be afraid of taking the initiative in the execution of their duty.

ORDERLIES. ("Meldereiter").

The communication of orders and information must only be entrusted to selected and thoroughly instructed men. In the German Artillery, important verbal orders are sent, if possible, by officers; failing them, orderlies of the lower ranks are employed. "The instruction must be carried to such a degree of perfection, that they can intelligently carry out the duties entrusted to them. Orderlies must be able to deliver not only orders, but information received from 'combat patrols,' auxiliary observers, etc." (German Regulations).

Training of Orderlies.

The training of orderlies should be on the same lines as that of scouts, and all that has been said about the latter, applies equally to the former.

Their theoretical training, therefore, should consist in instruction in ground, maps, obtaining certain tactical information, designations of the different units, formation of troops and protective duty.

Besides this, orderlies should be thoroughly acquainted with the rules for artillery fire, and the terms used in connection with it. Their instruction at first should consist in repetition and explanation of orders and information given to them.

More difficult instruction should gradually follow, such as making them repeat a certain communication after the lapse of a short time, and introducing foreign names of local objects into it. These exercises should then be repeated at mounted drills in different places, in a strictly practical manner.

Each orderly is given an order to deliver, he is shewn a way to go at a certain pace, on which he will meet a certain number of obstacles, and is told the time and place at which he is to arrive. The instructor assembles at that place all the orderlies, makes them repeat their orders, and points out their mistakes, explaining what might be the consequence of them on service.

Duties of Orderlies.

An orderly sent with a message, should only concern himself with getting over the distance at the pace ordered. If it is given to him verbally, he should repeat it before starting. The pace is generally told him, but otherwise it depends upon the distance and the importance of the message. He should take the shortest road if he is sure it will

lead to his destination, but should avoid short cuts which may impede him. When batteries are in action he must avoid moving over the zone of their fire. When the orderly reaches the officer he is sent to, he should pull up, and before delivering his message, he should take breath. He should commence his message by saying whom he comes from, thus :—"From Officer Commanding 1st Brigade-division." He then repeats the message as he received it. If the officer asks him how the message is to be understood, and the orderly does not himself know *for certain*, he should never give his own impression. Having delivered his message, the orderly should acquaint himself with the position of affairs at that place, so as to be able to answer questions on his return. The orderly returns leisurely to his Commander, and repeats to him the message as he has delivered it, thus :—"I have given to the 2nd Battery, the order to move to the hill on the left."

Examples.—The following are brief examples of orders such as might be sent by orderlies from a Brigade-division Commander. These orders should contain very full instructions to the batteries especially as regards the time of commencement of a movement.

Example (1) Orders sent back by the Brigade-division Commander, who has gone on to reconnoitre.

> *1st Brigade-division Order.*—"Battery Commanders are to ride forward to the hill on the left of the road behind the village. The batteries to prepare for action in line, on the left of the village, the right flank 100 yards from the crest. Range 2500 yards."

Example (2) The Brigade-division Commander has not time to send for the Battery Commanders to indicate their positions, etc. He sends the following order, which is delivered by the Adjutant and orderlies to the Battery Commanders as they arrive near the position.

> "The position extends from here to the road on the right. 1st Battery on the right. Target, three batteries on the height to the left of the mill. Each battery to engage the one opposite to it. Range about 3500 yards. Wagon échelons of 2nd and 3rd Batteries behind the crest, 50 yards on the left of the line; of the 1st Battery, on the right of the line out of view of the enemy's right battery. Open fire immediately."

Example (3) When in action, the Commander communicates to the Battery Commander the information he has received from the "combat patrols," thus :—

> (*a*) "The enemy's batteries are in échelon from the right, 700 yards from the windmill. Limbers in column behind the trees on their right."
>
> (*b*) "The batteries are among the trees and hedges that mask them. They are on the slope facing us; in front of them is a ravine, 500 yards broad."
>
> (*c*) "Our fire is 600 yards short of the right battery. The apparent 'overs' are falling into the ravine. All batteries will re-commence ranging with 600 yards more elevation."

(*d*) "2nd and 3rd Batteries to fire shrapnel; 1st Battery continue with common shell, increasing 100 yards every round till they have the bracket of the enemy's right battery."

(*e*) "1st Battery switch on to the little wood on the right. Range on the edge, and then search it with shrapnel at the enemy's limbers. If the enemy show on your right turn on to them at once."

Any new target that appears can generally be pointed out by reference to some conspicuous object, but an orderly must remember that its relative appearance varies with his own position, and when proceeding to deliver a message, must keep the new object in view the whole time. Thus, referring to the example, the new target may be to the right of the windmill from the 1st Battery, but to the left from the others.

ADDITIONAL.

Orderlies are also required by the Battery Commanders to communicate, if necessary, with the Commander, and also with the 2nd échelon of wagons.

In the latter case, they should always bring back information from the wagons as to the amount of ammunition expended, thus:—

"1st échelon has two wagons and one box of common shell per battery left."

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PRÉCIS

AND

TRANSLATION.

"Oruzhennii Sbornik."

8th DECEMBER, 1892.

THE ELECTRIC WELDING OF METALS.

BY

S. VON DITMAR.

TRANSLATED BY

LIEUTENANT E. A. CAMPBELL, R.A.

Among the expositions of the various applications of electricity to metallurgy at the electrical exhibitions held in St. Petersburg and Moscow were exhibited the processes of Benardos and Slawianoff.

The electric welding of metals is based upon the employment of the high temperature (reaching 4000 degrees centigrade) of the voltaic arc. Benardos, a Russian mechanic, was the first to solve this problem practically. A conductor from the negative pole of an accumulator battery is attached either directly to the object to be welded, or to an iron anvil on which that object rests. From the positive pole the conductor passes into an insulated handle, which terminates in a carbon pencil. The workman, holding the handle, touches the object with the carbon pencil, thereby completing the circuit of the electric current, then slightly raising the handle he by this means strikes an arc between the carbon pencil and the object. If the pencil be drawn, for example, parallel to the junction of two slabs, then they will be quickly welded. By the inclusion or exclusion of accumulators, charged from the dynamo, the strength and pressure of the current can be regulated as required.

The process of Benardos is practically employed in Russia in many railway workshops, at the Nevsky Factory, at the works of the inventor himself at St. Petersburg, and at the Kolomensky Engine Works; in Austria, at Vitkovity, and at the Rotschild Ordnance Factory; and in England at Lloyd and Lloyd's, where the process is used for welding tubes. As such a process might be useful in ordnance factories, the following general description of it, as carried out at the Kolomensky Engine Works, is given.

Five hundred accumulators are used, and they are arranged in 10 groups in parallel, each group consisting of 50 cells in series. They can in this manner be charged by a dynamo running at 125 volts, and giving out 120 ampères.

When the cells are discharged during the welding the 10 groups are in parallel, and by means of a switchboard the number of cells in series in each group can be reduced by five at a time. Thus leaving 45, 40, 35 and so on cells in series in each group. The operators wear thick leathern gloves and a leather mask, with darkened glass eye-holes, to protect the hands, the skin of the face, and the eyes respectively. For convenience sake this mask is only worn at the moment of electric contact, and the preliminary operations are carried on without it. We will take as an example of this process the welding of a tube for a piece of ordnance by the aid of the voltaic arc. For this purpose plates are bent to calibre with their longitudinal edges meeting each other. The edges are cut obliquely, thus forming a trough along the outside of the whole extent of the future welding. The actual welding is performed as follows:—Having connected the future tube with the negative pole, the sides of the trough and pieces of iron placed thereon are touched with the positive electrode in the handle. The handle is then withdrawn, and the arc is struck. In consequence of the high temperature the iron is instantly fused, and fills up the trough. The surface of the welding is forged and levelled with a few blows of a hammer. Then again fresh iron is introduced, melted as before, and forged and levelled as before. This operation is continued until the whole of the trough is filled up with melted iron, and a perfectly welded tube is formed from the bent iron plate. Thus, thanks to the process we have described in detail for iron and generally for tubes of other metals, the simple and quick method of electric welding has been substituted for the slow and difficult method of casting. When tested the fracture at the weld is similar to that of the plates themselves, and in some cases the fracture has occurred in the plate instead of at the weld.

The method of Benardos furnishes a means of joining together different metals without the employment of solder, which might be injurious as well as inconvenient. Thus it is possible by means of the above process to substitute for thick copper pipes thin iron ones lined with copper.

Up to the present time it has been considered impossible to weld the broken cast-iron portions of engines, stands, etc. By means of the above process such an operation is now practicable.

The chief objection to the employment of this process is that the voltaic arc is rich in chemically-acting rays, which act most injuriously on such sensitive tissues as the surface of the eye and the skin of the face and hands, etc. But measures can be taken to neutralise this action, as above described. Furthermore, not everyone is equally sensitive to it.

The method of Slawianoff is, in the main, similar to the above, and differs from it only in detail. He uses pencils of metal in place of carbon, and in filling up the trough, instead of adding the metal in layers, he prevents the fused metal cooling until the whole trough is filled up. Furthermore, whilst Benardos always connects the anvil with the negative pole so as to render the oxidation of the object impossible, Slawianoff changes the poles about twice during the operation, though before the completion of the operation the whole of the object must be negative. The chief advantages of electric welding are that metals such as wrought-iron, platinum, etc., which can only be fuzed with the greatest difficulty, can by its aid be joined together without the employment of solder, the process is inexpensive, expeditious, and does not require much apparatus.

As an instance of the application of the process of Slawianoff may be cited the repair of the Tsar Kolokola,[1] or great bell of Moscow.

A fuller account of Slawianoff's method may be found in the *brochure* "*Die Herstellung von Metallgussmittelst Elektricitat nach dem Verfahrew des Berg*," Ingenieur Nikolai Slawianoff.

[1] Literally Emperor of Bells.

Extracts from the "Oruzhennii Sbornik," of the 23rd July, 1893.

German Smokeless Powder.

A fresh stage has been arrived at in the re-armament of the German Army. In consequence of the numerous defects of the present smokeless powder, a new powder which has been discovered will shortly be introduced.

At Spandau, work has been suspended for a short time to enable the apparatus necessary for the production of the new powder to be erected. The reserve of old cartridges and powder will either be expended at manœuvres or sold to uncivilised nations.

The replacement of the present supply of powder and cartridges will take at least two years.

Trial of the New Smokeless Powder, Apirite.

Apirite, which possesses many valuable qualities for use with rifles of small calibre, has been discovered quite recently at Stockholm. This powder burns without flame, does not heat the chamber, can be transported without risk, and is not susceptible to damp or heat. The results of experiments are as follows :—

Ten rounds of a nitro powder, 15 of ordinary Swedish powder, and 15 of apirite were fired from a magazine rifle of small calibre. The barrel was less heated by apirite than by either of the other powders. The rifle, after 800 rounds, was left uncleaned. After eight days it appeared as clean as if just prepared for firing.

NOTES
FROM
CORRESPONDING MEMBERS.

THE subject for the Duncan Gold Medal Prize Essay, 1894, is—

"What is the best tactical organisation and system of training massed batteries of Horse and Field Artillery?"

THE following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893:—

Captains (*c*) and (*d*) ... price 1s. 1d.
Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

DURING the past month the R.A. Institution has received from Henry G. Slade, Esq., a gift of MS. Order Books, Note Books, Pay and Messing Books and Diaries, the property of his father, the late Captain Henry Slade, R.A. Captain Slade became a cadet in 1806, and was commissioned in 1809; he served in the Peninsula, whence he was sent direct to North America in 1814, and was engaged in operations on Lake Huron. He was promoted Captain in 1840, and died in 1841 at Jamaica, in an epidemic which carried off nearly every officer and man of the Royal Artillery in the island.

The diary and various letters refer to several well-known Artillery officers, and the gift is one for which the Committee are most grateful.

"HOME'S Précis of Modern Tactics." Revised edition by Lieut.-Colonel S. C. Pratt, R.A., 1892, has been removed from the library of the R.A. Institution by an officer who has omitted to enter it in the Register of Books on loan. The Committee will be glad if it is returned.

The following Recruiting Notice, though printed within 50 years of the present time, is amusing, and contrasts curiously with the modern businesslike notice.

Fine Young Men

of respectable Parents and Good Character, have an opportunity (if not married or Apprentices) of joining the

Royal Artillery.

In which Superior Service they may be made gentlemen of and treated accordingly. They must measure 5 feet 8 inches in height and be between Eighteen and Twenty-two years of age. Growing lads not more than Seventeen may be admitted. They will all receive the same *Liberal Bounty of £5 15s. 6d.*

On their arrival at Head Quarters they will be taught the art of *Riding, Driving, Drawing, Fencing, Gunnery, and the Mechanics, The making and use of Gunpowder, Sky Rockets and other Fireworks,* and by the power of the lever to move a 42 pounder Battering Gun with the same facility as a *Penny whistle.*

The Cannon used in the Field are called

Flying Artillery

From the astonishing rapidity of their movements. The Gunners (for so Artillerymen are styled) wear a

Splendid Uniform

and are well mounted on taking the Field.

They are lodged in the finest Barracks in the World. They have Light Work and Good Pay, the best Beef that Kent can afford, and a comfortable place in the Barracks called "The Canteen" set apart for them to see their Friends in and take a cheerful glass, also a splendid Library and Reading Room; a Park and Pleasure Grounds, with a select number of Horses for their Instruction and Amusement. After their "Education" is completed they will have an opportunity afforded them to Travel to Foreign Countries, where they may drink their Wine at Two-pence per Bottle by the new Tariff !! If well conducted they will be promoted to

Non-Commissioned Officers

From whom the Quartermasters are selected, who are the best paid in the Army, and return to see their Friends with money, manners, and Experience !!!

The Rates of pay of the Royal Artillery are as follows :—

Quartermasters ... ... 7s. 10d. per Day.			
Sergeant Majors ... ... 4s. 2¼d.		Quartermaster Sergeants ... ... 3s. 8¼d.	
Sergeants ... ...from 2s. 6¼d. to 3s. 0¼d.		Corporals ... ... from 2s. 3d. to 2s. 9d.	
Bombardiers ... ... from 2s. 1d. to 2s. 7d.		Gunners and Drivers from 1s. 4¼d. to 1s. 10¼d.	
Farriers ... ...from 3s. 3¾d. to 3s. 7¾d.		Shoeing Smiths ...from 2s. 2¼d. to 2s. 6¼d.	
Collar Makers ... from 1s. 11¾d. to 2s. 3¾d.		Wheelers ... ...from 1s. 11¾d. to 2s. 3¾d.	

Young Men wishing to avail themselves of the advantages here offered (with the consent of their Friends and good References) may apply to the Recruiting Sergeant of the Royal Artillery, at the Rendezvous.

At the Old Angel Inn, Taunton.

Taunton, March 8th, 1845.

W. Court, Printer, &c., Fore Street, Taunton.

R.A. GAMES' FUND.

It will be remembered that a short account of the R.A. Games' Fund appeared in the Notes of "Proceedings" for December, 1892, and as the result was an accession of subscribers to the Fund, it is thought that an account of the Fund during the past year will be welcome.

The grants made up to November, 1892, numbered 49, varying in amounts from £50 to £5, and issued to Royal Artillery stations in all parts of the world.

The grants made since the above date are as follow :—

		£	s.	d.
	1892.			
Malta	R.A. Officers' Boat Club	15	0	0
	1893.			
North Camp Aldershot ...	Tennis Courts for New Mess House	30	0	0
R.A. Cricket Club...	Lawn Mower	20	0	0
Halifax N.S.	Officers' Yacht	25	0	0
North Camp Aldershot	Tennis Courts for New Mess House, balance of grant. ...	30	0	0

In addition to these the Fund has this year borne the heavier expenses consequent on the Inter-Regimental Racket and Billiard Matches being played at Woolwich, this being the main object for which the Fund exists.

The Inter-Regimental Matches resulted in the Royal Artillery retaining possession of both Cups for another year.

At the time of the contests for the Cups general dissatisfaction was expressed with the Rules under which they were conducted ; accordingly the Committees of the Regiment and of the Royal Engineers determined to submit fresh Rules for the approval of the subscribers to their respective Funds.

The voting by Royal Artillery subscribers will not be closed until the 31st December, but at the time this is written every paper sent in bears record of a vote in favour of the new Rules ; so that there is every probability of their being adopted.

In this case each Cup will be won definitely every year, and held through the ensuing year by the winners.

During the past year requests have been made to the Committee for grants to stations where it was found that only two or three out of the 15 or 20 officers serving were subscribers to the Fund ; the Committee will not make a grant under these circumstances, as they consider that grants should only be made to places where a large majority of officers subscribe to the Fund.

Officers might bear in mind the fact that they will find benefits resulting from the Fund in most stations in which they are likely to serve.

Anyone wishing to subscribe can sign the form below, cut it out, and send it to the Hon. Secretary, R.A. Games' Fund, R.A. Institution, Woolwich.

There has been no change in the Committee during the past year.

GAMES' FUND.

Messrs. Cox & Co.,

Please pay the Annual Subscription of my rank to the "R.A. Games' Fund" until further orders, commencing from 1st January, 1894.

Rates of Subscription :—

	s.	d.
Senior Officers optional		
Lieut.-Colonels .	9	0
Majors	7	0
Captains	5	0
Subalterns . . .	3	0

Date _____

Name and Rank _____

DOVER.

The Mess Committee record with gratitude the presentation, to the Officers' Mess, of a fine boar's head, by Captain J. D. Anderson, R.A.; also the receipt of a cabinet photograph of Major-General Ormsby, who commanded the R.A., South-Eastern District, from 1864 to 1866, from Lieut.-Colonel W. G. Knox, C.B., which, when mounted and framed, will fill one of the two vacancies for portraits of Colonels-on-the-Staff since 1860, the other vacancy being that of Major-General Elwin, who was commandant at Shoeburyness about 1870. The Mess Committee hope to receive a few more heads or horns, either as gifts or on loan, the ante-room requires four more, to fill blank spaces. One more want the Mess Committee desires to make known, viz.: Nos. 123, 124 and 144 "Journal of the Royal United Service Institution," which are required to complete the whole series, Vols. I. to XXXVI., which Colonel Lloyd, C.B., R.A., is presenting to the Mess.

Lieut. E. L. Tomkins has rejoined 2 Company, on completion of the Long Course, and Lieut. C. G. Vereker takes his place in the next Long Course.

2nd Lieut. G. B. Mackenzie has been appointed Instructor in Army Signalling for R.A. *vice* Vereker. Lieut. Mackenzie has recently obtained the Aldershot certificate.

Lieut. Claud Lonsdale, Sussex Artillery, has joined the Depôt for duty.

WOOLWICH.

The annual dinner at the R.A. Mess to owners and occupiers of land hunted over by the Drag took place on the 28th October; it was attended by a larger number of guests than usual, much to the delight of all connected with the hunt.

The hunting season opened most successfully on the 1st November with the usual lunch at the Mess and the "Earl of Moira" run; there was a field of over 70, besides a large contingent on wheels. Although the runs are gradually being restricted by the cutting of the new railway, the extension of fruit gardens, and the use of wire, the number of different runs seems if anything to increase, thanks to the Master's genial manner with owners and occupiers.

On the 7th November Lord Roberts came down to lunch at Mess and hunt with the Drag; the meet was at Grove Park Station for the "Mottingham Lane" line, the second line finishing in the fields below Severndroog Castle. Lord Roberts was well in front throughout, and expressed himself delighted with his ride.

At the farewell dinner on the 7th December to the R.A. officers with drafts for India, there were present, besides Major Yorke, two ex-Masters of the Drag in Captains Vores and MacMahon.

Golf has this year been placed on a very much better standing than heretofore; there is now a professional with a fixed charge for a round; the course is greatly improved by the erection of wattles and arrangement of holes so that there is now no driving over the central path of the Barrack Field; a room in the Cricket Pavilion is placed at the disposal of the Golf Club, and, finally, the caddies are relegated to the neighbourhood of the Pavilion and no longer haunt the Mess.

During the autumn there have been four lectures at the R.A. Institution, all very well attended. A large party from the Staff College, with Majors Keir and White, and Captains Dawkins and Hume, came for the lecture on "Okehampton, 1894," by Major A. J. Hughes. On the 30th November, Captain W. H. Williams lectured at 5 p.m. on his "Travels in East Africa and Uganda;" the lecture was preceded by an "At Home" of the Committee R.A.I., with the result that there was an appreciative audience of some 250 ladies and gentlemen.

On this occasion the gallery of pictures by officers R.A. was lighted up for the first time, and attracted so many visitors that the room seemed hardly large enough.

The lecture by Captain Orde Browne on the 14th December, open to officers of the Army and Navy only, was followed by an interesting discussion on the "Directions for the Attack of Armoured Ships by Coast Batteries," and some valuable remarks were made by Admiral Sir R. Vesey Hamilton, K.C.B., Captain King Hall, R.N., and Commander Honner, R.N. Some of the naval officers from Greenwich dined afterwards at Mess.

On Wednesday, 13th December, there was an Assault-at-Arms at the Royal Military Academy. One noticeable point was its difference from similar functions of former years, when the whole show was confined to some dozen or twenty picked performers; on this occasion nearly every cadet took part either in sword exercise, free marching, bar bell exercise, or Balaklava *melée*. All concerned are to be congratulated on its passing off without a hitch.

On the 15th December, the Evening Party at the Mess was a greater success than any for some years' past. A great many officers came from out-stations, and for once there were more dancing men than ladies present; supper was arranged on small tables in the smoking-room, and as a cotillon began at the hour of opening the supper-room all crowding was avoided.

General A. H. King, C.B., dined as a Mess guest on the 21st December, and nowhere is his enforced retirement more sincerely regretted than here. A further loss we have to sustain is that of General Nicolls, who resigns the command of the Woolwich District in order that he may winter in a warm climate; all here hope that he will soon be restored to health and strength.

OBITUARY.

Major-General C. H. Ingilby, C.B. (retired), died at Spennithorne, Bedale, on 13th December, 1893. He joined the Regiment as 2nd Lieutenant, 16th December, 1846; became Lieutenant, 30th June, 1848; 2nd Captain, 20th June, 1854; Captain, 3rd January, 1859; Brevet-Major, 12th December, 1854; Brevet-Lieut.-Colonel, 9th November, 1862; Colonel, 17th December, 1875; and retired with honorary rank of Major-General, 19th February, 1884. Major-General Ingilby served throughout the Crimean War, and was present at the affairs of Bulganac and M'Kenzie's Farm, battles of Alma, Balaklava, and Inkerman (severely wounded), and siege of Sevastopol, including repulse of sortie of 26th October, 1854. (Mentioned in despatches, medal with four clasps, Sardinian and Turkish medals, 5th Class of Medjidie, brevet of Major).

Lieutenant A. C. Tulloch, whose death occurred at Myingyan, Burma, on 13th December, 1893, was commissioned as Lieutenant, 17th February, 1886. At the time of his death he was in command of guns in the Chin Hills.

NOTES

FROM

CORRESPONDING MEMBERS.

GOLD MEDAL PRIZE ESSAY, 1894.

As the time for sending in Prize Essays is drawing near the Committee think it well to repeat the following note, first published in August, 1893 :—

The Subject approved for the "Duncan" Gold Medal Prize Essay, 1894, is as follows :—

> "What is the best Tactical Organisation and System of Training massed Batteries of Horse and Field Artillery?"

The Rules for the Prize Essays now read :—

The Annual Gold Medal, when awarded, to be accompanied by an *honorarium* of £20; the Silver Medal by an *honorarium* of £10.

The candidates must be Officers of the Regiment who are members of the R.A. Institution.

Officers are requested to confine their Essays to about 16 printed pages of the "Proceedings;" other things being equal brevity will count towards success.

The Essays must be forwarded to the Secretary so as to reach him on or before the 1st of April.

Each Essay must be *type-written* in triplicate. The Essays must be strictly anonymous, but each to have a motto, and be accompanied by a sealed envelope with the motto written outside and the name of the writer inside; further, if the writer wishes to recover from the Committee part of the cost of type-writing his Essay he should state this fact in the same sealed envelope and write outside it, above the motto, "to be opened."

All the envelopes thus marked will be opened by the Secretary after the result of the competition has been announced, and he will send the writers the money for their type-writing expenses.

The Committee will allow a sum of £1 for type-writing each Essay.

The Essays will be submitted for decision to three Judges chosen by the Committee.

The Judges are empowered to recommend :—

1. That two Medals, one Gold and one Silver, be awarded, or
2. That only one Medal, Gold or Silver, according to the merit of the Essay, be awarded, or
3. That no Medal be awarded.

The names of the successful candidates will be announced at the Annual Meeting, and Medallists will be distinguished as such in all Lists, &c., issued from the Institution; and in the event of a University man gaining a Medal, a report of his success will be made to the University of which he may be a member.

The successful Essays will be printed and circulated to members by the Institution.

With reference to the paper on "Army Schools," by Major A. M. Murray, R.A., published in No. 12, Vol. XX., R.A.I. "Proceedings," a correspondent writes:—

It is very interesting to note, in the paper on "Army Schools," that the standard of army education is deteriorating. It must not, however, be forgotten that the Official Return of men holding certificates is not an exact measure of the amount of education in the army as, in my own experience, I have accidentally come across men without certificates able to write well.

Still it is incontestable that the Education Act misses large numbers of children; and also that to many of those who have been taught to read and write, there is frequently, from the fatigue of daily physical work, poverty, and other causes, no leisure to read even if they could buy books, no necessity to read handwriting, and where monetary transactions are small no necessity for addition, and consequent forgetfulness of teachings; and this latter as well as former class we frequently get as recruits in the army.

In the Artillery, particularly Garrison Artillery, N.-C.-O.'s must teach themselves much; owing to the minutiæ of the different recoil, storage, machines, &c., N.-C.-O.'s require 2nd Class Certificates; but this only touches a percentage—those keen and energetic enough to work for a stripe.

I should be glad to see all recruits ordered to attend school until they have obtained a certificate; for though, when they leave the army, their employment may be such as to give them no necessity to use their education, still while in the Garrison Artillery a fair education is very much required.

School attendance enforced is a good disciplinary education for the lads of 18 now joining the R.A.

The following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893:—

Captains (*c*) and (*d*) ... price 1s. 1d.

Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

The following newspaper report may have escaped the notice of some officers in the Regiment. The Royal Humane Society has asked for an official report of the circumstances and, it is hoped, will soon be in a position to suitably recognise the brave deed:—

"A Reuter's despatch from St. Lucia says that the following incident, in

which the qualities of readiness and cool courage in an emergency were eminently displayed by British officers, occurred here in connection with the recent wreck of the English ship *Volga*. On Sunday, December 10th, this vessel, a three-masted steel ship, was driven ashore off Vigie Point. Besides her cargo of rice and linseed, she had on board 643 coolies, who were to be landed at St. Lucia and Jamaica, having been engaged as labourers for the sugar estates. The news of the wreck was speedily taken up to the military quarters, where at the time there were only three young officers—Lieutenant S. C. Halse, R.A., Lieutenant P. H. Parken, R.A., and Lieutenant Harrison, A.S.C. Without the loss of a moment the three lieutenants, who were in mess kit, saddled their horses and galloped down the Morne to the shore, intending to call out the crew of the garrison boat. The men were, however, not to be found, and the officers determined to put off by themselves to the *Volga*. The boat, which was a heavy six-oared gig, was launched with some difficulty, and the three young fellows started on their heavy pull out to the wreck, which was on the rocks, about a mile-and-a-half off. The tide was running strongly against them and, with a brisk wind blowing, the sea was high. Vigie Point terminates in perpendicular rocks, and a heavy surf was breaking over them. It was all that the officers could do by pulling their hardest to keep their boat from being driven by the wind upon the rocks. When at length, after a most exhausting row, the three officers reached the *Volga* they found her on the rocks with a heavy list to port, and the waves dashing over her. A large number of the crew and of the coolies had before this put off to the shore in the ship's boats, but there were still many on board, and the three lieutenants had to use great caution in approaching the ship for fear their boat should be swamped by a rush of coolies. They succeeded, however, at length in getting alongside, and filling their big boat with coolies, whom they eventually, together with the *Volga's* log and papers, landed safely in Castries."

MALTA.

At the Auberge de Castille, on Wednesday, the 20th December, the R.A. and R.E. Officers entertained at dinner His Excellency the Governor, Sir H. A. Smyth, K.C.M.G., to celebrate the 50th anniversary of his first commission in the Royal Artillery, and to bid him farewell on his approaching departure.

Besides the Governor and his staff the principal guests were the Naval Commander-in-Chief, Sir Michael Culme Seymour, Bart., K.C.B., and his staff. Altogether there were over 60 officers present.

On rising to propose the Governor's health, Major-General Nicholson pointed out that he had assumed office here at a particularly difficult period. A new legislative system had been introduced during the governorship of Sir Lintorn Simmons, but had hardly time to be consolidated before Sir H. Torrens assumed the governorship, and the latter's ill-health and sudden death had prevented much being done during his short tenure of office. Things were therefore in a transition state when Sir Henry Smyth arrived, and it was chiefly owing to his great tact and his cool judgment that the new system had been successfully established with the minimum of friction, opposition, and discontent. Sir Henry had many friends on his arrival here, but very many more on his departure, and to his social success Lady Smyth had greatly contributed. "Some years ago, sir," said General Nicholson, "on the occasion of your assuming the command at Woolwich, I heard you say that no man should boast when buckling on his armour. Now that the time has arrived to lay yours aside, you may be assured that boasting is unnecessary. Other tongues will be ready enough to tell of the good work you have done here."

The healths of Sir Henry and Lady Smyth were then drunk with great enthusiasm, and afterwards Sir Henry rose to return thanks. He is a man who speaks deliberately, and very much to the point, weighing his words well, before giving them utterance. He assured his hearers that he left, with great regret, the Regiment he was proud of belonging to, not so much because of the brilliant abilities and performances of some of its members, or so much because of its old institutions, or its general good repute, though none of these attributes should be underestimated, but because of the high sense of, and devotion to, duty, which, during nearly 50 years' service, he had always found to be a characteristic of its members as a whole. It is by this conscientious performance of duty that the honour of the Regiment in the field has been upheld, and the difficulties which the progress of inventions and the constant and rapid changes in armament, must continually present to artillerymen, have in the past, and will in the future, be successfully overcome by the Royal Artillery. He concluded by saying that he was very glad to take farewell of the Regiment in a Mess which belongs conjointly to it and its sister corps. The Royal Artillery and Royal Engineers have everything to gain by a close intimacy, and for his part, he had spent many happy days in similar joint Messes, and hoped that the one at Malta would long continue to flourish.

It is not very often that any part of the Regiment has the opportunity of entertaining a comrade of such long and distinguished service as Sir Henry Smyth. He has served in nearly every part of the globe, in the Crimea, in India, Canada, the Cape, and the Mediterranean. He has held important commands at Woolwich, the Cape, and Malta, and always with distinguished success; he formerly served as regimental officer, as member of the Ordnance Committee, and in other similar appointments. Few men have had more experience than he, none have more conscientiously shewn that devotion to duty, irksome or pleasant, which he claims to be the characteristic of the Regiment.

In expressing their regret at bidding him good-bye the Royal Artillery Officers at Malta feel that they only express the feeling of the Regiment at large.

UMBALLA.

THE CENTENARY OF "C" BATTERY, R.H.A.

On Wednesday, the 1st November, 1893, "C" Battery, R.H.A., commenced the second century of its existence, and the event was signallised at Umballa by a parade in the morning and a dinner in the evening. At the parade in the morning the occasion was taken as an auspicious one for presenting to the battery the prize presented by the late Commander-in-Chief, for competition in shooting by all the 12-pr. batteries in India, and won last year by "C" Battery, R.H.A. Another presentation also made on this occasion was a long service medal to Battery Sergt.-Major Perfitt.

The Royal Horse Artillery Brigade, under the command of Lieut.-Colonel Turnbull, were drawn up in church parade order near the R.H.A. Orderly Room, at 8 a.m., and Brigadier-General Pretyman, accompanied by his staff, having been received with a general salute, at once proceeded with the business of the day. The batteries having been formed into three sides of a square, General Pretyman said:—

Colonel Turnbull, Officers, N.-C.-O.'s and men of the R.H.A.:—It is a matter of considerable pride and pleasure to me that it should be my duty to present to "C" Battery, R.H.A., the prize for the best shooting 12-pr. B.L. Battery in

India for the year 1892–93, given by our most distinguished late Commander in India, General Lord Roberts, and I shall not fail to notify to his Lordship the circumstances of this presentation. We all know that unless a battery can shoot it is useless, and the importance of efficiency in this respect cannot be overrated. But it must also be able to move, and get to the right place at the right time. "C" Battery can do both. I remarked at the battery Balaclava Sports that the men rode particularly well, and that the horses were in splendid condition. I wish the battery every success at the approaching camp at Gurgaon, and hope they will again be successful in coming out at the top of the tree. I regret very much that the battery will shortly be leaving my command. I have known it for the last two years, and have always found that whatever it had to do it did well.

In the evening the N.-C.-O.'s and men were entertained at dinner, and were afterwards joined by Major-General Lewes, Brigadier-General Pretyman, Colonel Turnbull and the Officers R.H.A., Colonel Maxwell, Colonel Paley, Mr. Bignell, Major Kitson, Captain Stokes and Captain Gosset. Mrs. Turnbull was also present, accompanied by several ladies..

Major Rochfort, commanding the battery, proposed the first toast of the evening, which was drunk with all the honours, the entire company singing "God save the Queen," to the accompaniment of the 18th Hussars' band.

Colonel Turnbull proposed the health of "C" Troop in the following terms:—

Generals Lewes and Pretyman, Major Rochfort, Officers, N.-C.O.'s and Men of "C" Troop,—I consider it a high honour to have been here this evening—the "centenary" of your grand troop. You will soon hear from Major Rochfort the good service your troop has done in times past, but I am sure that if any of your forefathers were present here to-night they would be proud to see the condition of the troop as it is now. In the presence of the Inspector-General and the General Officer Commanding, it would not be becoming in me to say too much about what I think of the state of the troop, but I hope they will permit me to say that it is second to none. (Loud applause). In these days accurate shooting is everything; as Prince Kraft said, a battery is no good unless it can hit. "C" Troop has proved that it can do this by winning the Commander-in-Chief's prize last year for the best shooting 12-pr. battery in India, and I wish you luck this year at Gurgaon. General Pretyman has honoured you to-day by presenting the Cup, and by being present here this evening, and I am sure your pleasure has been increased in having received it from a Horse Artilleryman of the General's experience, who has the welfare of our proud service at heart. We all regret that you are leaving Umballa, but what is our loss is Meerut's gain. My time of soldiering is nearly over, but I can honestly say that I am proud to have had under my command "C" Troop during my last year of service in India. I will not detain you longer, but feel quite sure that as long as your fine troop has Major Rochfort in command, and such officers, non-commissioned officers, and men as I see here to-night, you will keep up your proud record whether in peace or war. I wish you one and all every luck and prosperity. (Continued cheers.)

Major Rochfort, in response, said:—

Colonel Turnbull, Ladies and Gentlemen,—On behalf of "C" Battery I rise to thank you for the honour you have done us. I hope this battery will continue to deserve the high character Colonel Turnbull has given it. He has spoken in very flattering terms, and these expressions, coming as they do from one who has served so long in the Horse Artillery, is so devoted to its interests, and, if I may be permitted to say so, knows so well what Horse Artillery ought to be, are a very high compliment indeed. I know that amongst other batteries we have met in India we always thought his old troop "T" was very hard to beat. It is right that on this occasion, when we are celebrating our centenary, that I should review, if only in a few words, the history of this battery. We know that any efficiency

that can be claimed to-day is in a great degree due to the reputation which has been built up during the last 100 years, and handed down to us by those who have gone before, and we also know that it is to history we must look as the source of that *esprit de corps* which is the best foundation for discipline. This year is not only the centenary of "C" Battery, but it is the centenary of the Horse Artillery, and that event was celebrated in London this summer by a dinner, at which His Royal Highness the Commander-in-Chief presided. Four Troops, "A," "B," "C," and "D," were formed in 1793, Troops "A" and "B" on the 1st January, "C" and "D" on the 1st November, but we share with the "Chestnut Troop" only the distinction of having preserved our designation with an unbroken record of service from our formation to the present time. I have just received the following telegram from the "Chestnuts": "Chestnut Troop send 'C' Troop best congratulations on their centenary." They have not forgotten the links which bind us together. (Loud and continued applause). The Horse Artillery first saw active service in Ireland during the rebellion of 1798, when they were represented by "A," "B" and "C" Troops, and were engaged at the battles of "Ross (Wexford)" and "Vinegar Hill." "C" Troop was next employed on active service in the Peninsula, and disembarked at Corunna in 1808 to join a force then acting in Portugal under Sir John Moore. The theatre of war was soon transferred to the North of Spain, when they took part in all the subsequent operations, including the actions of Benavente and Sahagun, and they helped to cover that famous retreat to Corunna, when the British Army, though hard pressed by an enemy immensely superior in numbers, successfully embarked, having accomplished the object of the expedition. The Crimea was the next scene of our war services, when "C" Battery was engaged at the battles of the Alma, Balaclava and Inkerman. It also took part in the siege operations before Sevastopol, and in the autumn of 1855 accompanied the Cavalry Brigade on an expedition to Eupatoria, against the enemy's line of communication. I am proud to be now able to read a telegram which I have received from General Lord Roberts:—"My heartiest congratulations to the officers, non-commissioned officers and men of 'C' Battery, Royal Horse Artillery, on completing its centenary. May the coming century add to its glory." Although it may not be our lot to have opportunities of adding to those laurels in the field, yet I believe that under all circumstances its traditions in our hands will be fully maintained. I shall now, in as few words as possible, tell you the manner in which it is proposed to mark the event of our centenary. A general feeling exists among all ranks—past and present—that something should be instituted to form a permanent record of this day. On the advice of Colonel Whinyates, General Pretyman, and my predecessor, Colonel Knox, a scheme has been adopted for the endowment and maintenance of a fund to be called a "Centenary Fund," which it is proposed to devote to the following objects:—(1) The encouragement of games, mounted sports, and anything that tends to foster a soldier-like spirit and promote a high tone in the battery; (2) to charities, with certain reservations. It should be recognised that the fund is not intended to be a purely charitable one, but is meant only for the benefit of those men (including their families) who support it, and who, in the event of any special necessity requiring relief, are further willing to help themselves as far as possible; (3) to assist deserving men in starting in civil life through the means of military institutions. In this connection it should be understood that any attempt to follow them in their after career is undesirable, as tending to encourage improvidence, and having regard to the obvious difficulties of determining the merits of their cases; (4) to the purchase of a Centenary Challenge Cup for the purpose of recording annually the name of the "best man-at-arms" in the battery of the year. This cup, kept in the Officers' Mess, will be an interesting record of the results of the mounted

sports which now take place annually on the 25th October, the anniversary of the Battle of Balaclava. Sergeant Gould has proved himself the "best man-at-arms" this year, and his name will be duly inscribed on it. (Loud applause). All officers who have formerly served in "C" Troop have been invited to support this fund, and our appeal has been already most liberally responded to, showing the interest which they still continue to take in their old troop. Amongst them there is one in particular who has always identified himself with its fortune on all occasions. I allude to Colonel Whinyates. He commanded it for ten years; after his retirement he wrote its history, and has never ceased to keep in touch with us now serving. I met him in London the other day, when he told me that he would gladly return to India to command it again. I am very glad to see Regimental Sergeant-Major Graham, an old "C" Troop man, who has come from Meerut to join us to-night. It now only remains for me to thank the ladies, the officers, non-commissioned officers and men of other batteries and regiments for their presence here, and to propose the health of the past officers of "C" Troop, coupled with the name of General Pretyman. (Loud applause).

The band then struck up "Auld Lang Syne," which was sung by the entire company.

General Pretyman, who was loudly cheered on rising, then spoke as follows:—

Comrades of "C" Battery,—As a former officer of this distinguished troop, it gives me the greatest pleasure and satisfaction to be amongst you all to-night, on this occasion of the celebration of your centenary. It was my good fortune to have served in this battery at this very station during the years 1875–76, when we were ordered to England. The then Commanding Officer was Major (now Colonel) Whinyates, of whose keen interest in everybody and everything connected with his old command Major Rochfort has just told us. Indeed, he might well be called the modern father of the battery. Under him, in 1875, about this same time of year, we marched to Delhi to take part in the manœuvres which were held before H.R.H. the Prince of Wales on the occasion of his visit to India. I can safely tell you that in the various field days and reviews in which the battery took part it was "second to none." (Cheers). Major Rochfort has eloquently given you a brief history of the battery, and has recounted its past services. You have a fair fame and noble traditions to maintain. To you, the officers, non-commissioned officers and men now serving, this sacred heritage is entrusted. From what I know of the battery in the past, and from what I have seen of it in the present, I have every confidence that you will one and all worthily uphold the high reputation, and the good of your battery, whether it be in peace or in war, and wherever you may be called upon in the service of Queen and country. (Loud applause).

The evening was brought to a very successful conclusion with songs.

PRÉCIS

AND

TRANSLATION.

"RUSSIAN ARTILLERY JOURNAL."

THE MILITARY TRAINING OF FIELD ARTILLERY.

TRANSLATED BY

MAJOR E. A. LAMBART, R.A.

In connection with the subject selected for the Gold Medal Prize Essay, the following extracts from an article under the above heading, which has appeared in several consecutive numbers of the *Russian Artillery Journal*, may be of interest.

PART I.

Fundamental Principles of Manœuvre of Field Artillery.

Under existing conditions of the construction of the *materiel* of field artillery guns cannot be fought when in movement, and, therefore, movement does not represent an immediate fighting factor of artillery, but is only important in connection with bringing guns to the field of battle and moving them from one position to another when there. Hence it appears that the requirements of active service as regards the skilful manœuvring of Field Artillery are sufficiently simple and can be satisfied by a small number of more or less elementary formations. The skilful bringing of batteries to the selected fighting position is a matter belonging to the regulations for the manœuvre of mounted batteries, as is also the distribution on the position of wagons, limbers, and spare horses. The ruling principles are rapidity and concealment. As a matter of fact, as regards the effect of artillery fire under equal conditions of skill on the part of opposing forces, time is the decisive factor, and we should, therefore, look for a criterion of artillery instruction in the smartness of the different operations at the guns. This smartness must be attained not only on the drill ground, but everywhere. As regards this, it is necessary to remark that it is impossible to attain rapidity in taking up positions if the *personnel* are not thoroughly instructed in moving guns in every direction and on all natures of ground. The requirements of rapidity in taking up positions are more and more important owing to improvements in fire-arms and the increased accuracy of rifle and artillery fire. The open occupation of positions by artillery will, in all probability, be accompanied by tremendous losses, and must only be resorted to where taking up such positions under cover is absolutely impossible, or where it can be done unknown to the enemy. As regards manœuvre, what is most indispensable is also the most simple.

The elision from the drill-book of all that is superfluous and the retention only of what is indispensable will enable the artillery to most thoroughly grasp the latter, and so to perfect its preparation for war. The frequent use on future battle-fields of artillery in large masses demands from this arm :—

1.—Ability to carry out long rapid marches.

2.—Formations adapted to every kind of ground.

3.—Pliable and rapid evolution, combined with fighting unity, *i.e.*, the ability of a battery to pass the numerous obstacles which will be found in cultivated country. Again, the wide development of the artillery fight requires such a system of ammunition supply as will at any given moment secure the replenishment of ammunition boxes however great the expenditure may have been. Hence follows the necessity for satisfying the requirements enumerated so that in no case and under no conditions shall the effect of artillery fire be limited by their non-fulfilment.

The condition of *simplicity* points to the adoption only of drill movements, the nature of which will impose on the most subordinate commanders duties that can easily be carried out. The condition of flexibility is fulfilled by the application in manœuvre of those principles which enable artillery to move in every direction without being delayed when it encounters unexpected obstacles. Thus the front of a line of batteries must be elastic so that they may adapt themselves to every kind of ground, and, moreover, must also allow the possibility in cases of necessity of lessening its vulnerability by increasing the intervals between the guns.

Rapidity in manœuvre is obtained by rapid pace and choosing the shortest way ; as regards long rapid marches it is limited by necessity of using a gentle trot which can be kept up for a long while without exhausting the horses. The security of ammunition supply requires :—(1) The proximity of the rear échelons of the ammunition wagons to the fighting line without exposing them ; (2) such an organisation of these échelons as will enable them to follow their batteries at all paces ; (3) the maintenance of constant communication between the wagons and the fighting line ; and (4) keeping the échelons of wagons complete in ammunition, men and horses. As regards the replenishment of the expenditure of ammunition and the replacing of losses in men and horses, our regulations must undergo a radical reformation. This follows from the necessity of embodying the above-mentioned first échelon of wagons in the fighting line of a battery. At practice the feeding of the guns with ammunition is carried out from the wagons which with this object must be brought on to the position. At present in carrying out service practice in peace time only one wagon per half battery is brought into the position, the other two wagons of the battery composing a first échelon are generally placed near the fighting line, either apart or in the same place as the gun-limbers. It is clear that the supply of eight guns from two wagons cannot satisfy the requirements of actual war. At critical moments the expenditure of ammunition may exceed the available supply in the two wagons, while the exchange of empty wagons in this case always runs the risk of not being carried out simultaneously. It would seem better to place in the fighting line one wagon per section which would require for an 8-gun battery all the wagons of the first échelon. Hence it follows that the present division of our batteries at war strength into the fighting line, and the first and second échelon of wagons must be altered to a division into the fighting line (guns and limbers and one wagon per section) and an échelon of wagons.

The drills in peace time must be directed to the ceaseless preparation of artillery for their work in war. This principle must be the fundamental one of the drill-book. From the conditions of employment of masses of artillery we must draw up the regulation for the action of such groups of batteries as are adopted as the tactical units of Field Artillery. In our Field Artillery there does not yet exist an artillery unit suited to be the tactical unit of artillery. The 6 or

8-gun battery is too small for this purpose, and the 6-battery brigade is too large, but we find even now in our artillery the foundation for such a tactical unit. In all probability the artillery regiments, the introduction of which is expected from day to day, will satisfy in their organisation the present day conditions of an artillery unit. Under the name of regiment will be understood a group of three 6 or 8-gun batteries. As artillery fights only in connection with the other arms the drill regulations of Field Artillery must always bear this fact in view as a guiding principle * * * *

In all artillery columns the flexibility of the whole depends solely on the flexibility of the leading portions. The remainder can always very easily adapt their movements to those of the guns or sections in front of them. The regulations must lay down as a guiding principle, conformation to the pace and direction of the commander in all changes of direction and pace without special orders or words of command from him. This principle must be formulated thus : *the commander of any body is the guide of that body.* If the head of a body has a front of several guns or sections it is necessary that they should all be able to easily see the commander of the body. Hence follows a *second* principle *the place of the commander is in front of his command.* If several units have to assimilate their movements for the preservation of a broad front then the flexibility of the whole requires that the constituent elements of them should be connected with the corresponding elements of the neighbouring unit only by means of the corresponding commanders or leaders. Every battery in a group constituting a regiment, every section in a battery, must move as if it were acting independently. This principle of the independence of corresponding units, borrowed from the French artillery regulations, must find a place also in our drill regulations : it is the condition which renders it possible for batteries to adapt themselves to the conditions of ground. And acting on this principle the numerous obstacles will temporarily only delay that unit in front of which they occur : on his own initiative the commander of this unit will change its direction and pace in order to circumvent or pass over the obstacle, and then by the shortest road will regain his place in the general alignment. The order to dress by the centre of a broad front, or by one of its flanks, is only permissible in exceptional cases on perfectly open and level ground for the sake of preserving the symmetry of the general front for appearance sake when this is obtainable without loss of flexibility. In order not to deprive, by the laying down of such a principle, the commander of a body of his independence of movement and freedom of action (for instance, for purposes of instruction), the regulation must give him the right, if he wishes, of assigning his duties as *guide* of his command to one of his subordinate officers.

The commander of a body when fulfilling his duty as its guide cannot with due attention see to the carrying out of his own orders. To obviate this inconvenience the French Field Artillery have introduced "section lockers," who are the senior of the gun "Nos. 1," and whose duty it is to see to the carrying out in the sections of all orders and words of command. In a Field Battery the "No. 1" of the gun of alignment is answerable for keeping the direction, and all the other "Nos. 1" for dressing, intervals, and distances. Under such conditions all flexibility of the front disappears, and the least mistake in the direction of movement of long lines immediately affects the pace of their flanks. On broken ground such a want of flexibility of the front is quite inadmissible. In circumstances where there can be no idea of accurate dressing of a more or less prolonged front, as, for example, when manœuvring over broken ground, Battery and Section Commanders will be quite able to see to the carrying out of their orders and words of command in their commands, and the same may be said of the gun "Nos. 1" as regards their duty of seeing to the carrying out of orders from the front relating to their own guns. On the other hand, on perfectly open and level

ground, on the command, "Eyes centre, right, or left," the order of things existing up to that moment ceases in those cases when accuracy of dressing can and may be obtained at the expense of flexibility of front. The use of special "section lockers" is not called for by any great necessity; in our batteries, without them, we can boldly circumvent obstacles, but this is quite impossible without independence of units. It will be better to establish this independence by an absolute regulation than to allow it only as an exception to a fixed principle of dressing which can only be adhered to on level and open ground, which latter may be looked upon as an exception rarely met with when manœuvring.

Some Rules and Principles which should find place in the Drill Regulations of Field Artillery.

1.—The simultaneous and accurate execution of drill manœuvres depends on the certainty, exactitude, and rapidity of the transmission of orders. *The voice*, raised in proportion to the extent of front and depth of the formation; *signals* with the sword or hand in combination with the direction and pace of the horse; in the case of a very extended front, *trumpet sounds*; and, lastly, ORDERLIES represent the means for obtaining rapid transmission of orders and their simultaneous receipt. The drill-book should lay down the conditions for the employment of one or other of these singly or in combination. It must, in particular, settle the meaning of signals of the sword or hand, distinguishing between caution signals and executive signals so as to avoid the possibility of doubt and confusion. The verbal transmission of orders by means of orderlies is of great importance in the field. Although at drill parades it is not always necessary to have recourse to this means, the regulations should enjoin its application because practice on a large scale in peace time is an excellent means of training orderlies in their duties of maintaining connection between different units in war. Besides, by using orderlies it is possible to manœuvre a whole regiment on the move. Orderlies may be used to maintain the connection between the fighting line and the échelons in rear for the purpose of replenishing ammunition and replacing casualties, or in manœuvre to maintain connection between different units of the command. For this latter purpose the *personnel* at the disposal of commanders of units is insufficient for service, and must be increased by means of the batteries. The regulation should clearly lay down whose duty it is to act as the links of the connection which every unit must maintain in the interest both of replenishment of ammunition and of manœuvre, on the general principle that every connection should be established from the *rear* to the *front*, from the subordinate to the commander. The regulation must also fix the time for establishing this connection; as a general principle this would be the time when the batteries pass from rendezvous to fighting formation.

2.—As regards the method of instruction, the regulations should principally enjoin a certain progressiveness in the exercises laid down. Special exercises should be established to enable officers to work out for themselves the comparative importance of different formations which can hardly be gathered directly from the text of a drill-book. Officers when handling fighting and tactical units at war strength will have frequent opportunities of learning the relative value, under different circumstances, of the several drill formations. Generally speaking, the method of instruction should compel officers to practice themselves in solution of manœuvring problems, such as the following:—"To move a given body of artillery which is in such and such a formation, in such and such a position, in the quickest and simplest manner to a given position into a given formation, and in a given direction."

3.—In the regulations for the riding-school, the following general principles of driving-drill must be laid down:—

(*a.*) Regularity of paces.

(*b.*) Gradual change of pace.

(*c.*) On even ground only hand horses to be in draught with a view to saving the riding horses, which should be in draught only on bad or heavy ground, or on ascents or descents. These regulations should also settle the paces applicable to Field Artillery under different circumstances of drill movements and road marches; and, lastly, the conditions under which Field Batteries may employ the *rapid trot* * * *

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Marches may be prolonged and continued for several consecutive days, and it is, therefore, very necessary that they should be carried out without forcing the pace so asto save the horses. But, on the other hand, it is a very good thing to lessen the duration of a march, as the strain on the horses when the pace is not forced depends principally on the weight they carry and the length of time they are kept in draught. The happy mean is best obtained by the alternation of long walks with gentle trots, kept up for a considerable time. It has been established by numerous experiments that the pace at a walk is 115 yards, and at a trot 230 yards a minute. A trot at this rate can easily be maintained by artillery for two miles at a time. Horses, even when unused to being ridden, can thus under all normal conditions of temperature on ground of average profile do 5·3 miles in an hour including halts. Batteries which train their horses methodically and progressively can easily, even on long marches, keep up 5·9 miles an hour. In circumstances when it is necessary to increase the rapidity of the march it is best done by increasing the length of the trots with a corresponding increase of the intervals between them. Field Artillery can arrive at keeping up a trot on the march to the extent of two-and-a-half or even three miles, and on good roads with this change of pace move for two hours between halts and without undue strain on the horses.

The closing up of carriages on the top of each other, jerky starts, and sudden halts, are the principle causes that exhaust draught horses.

4.—The present regulations for our Field Artillery for gun and battery drill give the following measurements for horse guns: in Field Artillery 24 paces and in Horse Artillery with detachment rear 34 paces. The intervals between two guns in line is the same for Horse and Field Artillery, 27 paces, *i.e.*, the length of a gun plus a distance of three paces to the gun in front when moving from line into column of sub-division. The interval of 27 paces must be considered a very large one, and renders the command of an 8-gun battery very difficult. If the No. 1 is placed along side of the lead driver we may lessen the length of a sub-division by four paces, and by shortening the traces to nine feet lessen it yet another pace and a half—this would enable us to fix the interval in line at 21 or 22 paces, allowing one or two paces distance from horses' heads to gun muzzle in column of sub-divisions.

Full intervals reduced to this limit are much more convenient. They are large enough to lessen the effect of the enemy's projectiles, and, at the same time, make the battery more handy and easily commanded in line. Besides full intervals, we should have close intervals of five paces and various reduced intervals. At full or close intervals Section Commanders should be in front of the line of their Nos. 1.

5.—In order to enable the fire to be quickly concentrated, flexibility in the direction of the flanks is necessary. If the guns are placed at equal intervals the fire of the battery cannot be much inclined to the flank, as the fire of each gun would be dangerous to its neighbour. But if, on the other hand, the guns of each section are closed as much as possible and the intervals between the sections increased, a considerable inclination can be given to the fire without any danger to the neighbouring sections by a slight change in the direction of the front of each section. Such a fighting arrangement of the section at close intervals presents also other advantages, viz.:—

(*a.*) The wagon placed in the fighting line for the supply of both guns of the section is close to them.

(*b.*) Section Commander can more easily look to the work of his gun detachments.

(*c.*) The observation of all that takes place in the battery is also made easier as the sections are separated one from the other.

(*d.*) It imparts elasticity to the front of artillery in action, because the extension or closing in of the general front does not entail any change in the normal formation of the section. This closing together of the guns of the section is, of course, limited by considerations of convenience in working the guns and the target presented to the enemy. The interval may be taken at eight paces.

6.—The supply of ammunition in action must be from the wagons, so as to keep the limbers complete as long as possible, except when the battery advances to very short range.

The regulations should, therefore, lay down the position of the wagons as immediately in rear of the line of guns, in order to save the numbers whose duty it is to bring up ammunition.

The limbers should be drawn up in the 3rd line at a considerable distance in rear of the guns, or in section column in rear of, and outside the flanks.

7.—Our artillery regulations only recognise sub-division and battery instruction, completely ignoring section instruction, but in view of the principle of complete independence of sections in battery manœuvre, it is necessary to establish also intermediate section instruction, which should be directed to teaching Nos. 1 to keep their proper interval and distance from their Section Commander.

8.—In all cases where circumstances allow of it the advance of batteries to the fighting position should be made at full interval *in line* in order to avoid the necessity for drill movements on the position itself. The regulations should lay down that the regular advance into the fighting position is to be made in line with a front for each battery of 115 yards at least. They should also lay stress on the necessity for gradually reducing the pace so as to halt on the intended position. This gradual slackening of the pace delays the halt by some seconds, but considerably hastens the opening of fire, because it ensures the absence of excitement, which is indispensable for giving and receiving the orders relating to the target, &c.

9.—The very large expenditure of projectiles which we must expect in future battles renders it necessary to bring under the immediate control of the Battery Commander on the battle-field the whole of the battery wagons. Batteries at war strength consists—light batteries, of **8 guns** and *12* wagons; heavy batteries, 8 guns and 16 wagons; horse batteries, 6 guns and 12 wagons, with a certain number of spare men and horses. There are besides in every battery 1 spare gun-carriage, an artificer's wagon, and an ambulance. When it approaches the fighting position the battery is divided into two échelons, the fighting line and the reserve. The fighting line should consist—in light and heavy batteries—of **8 guns** and 4 wagons; in horse batteries, of 6 guns and 3 wagons. The remaining wagons and the spare carriage form the fighting reserve or 2nd line. The wagons of the fighting line are manœuvred independently of the guns: their principal duty being to keep immediately in rear of the battery whatever its formation. In principle every fighting position ought to be reconnoitred, and the case of the occupation of a position which has not been carefully reconnoitred and marked out by the Battery Commander should be of rare occurrence. The regulations should lay down the system of reconnoitring and occupying a position in all its details. When a battery is in action and no sudden attack need be expected it should take steps to render itself less vulnerable by detaching temporarily all the constituent parts which are not absolutely necessary for carrying on the fire. In such cases the battery should place its limbers under cover, and even its wagon horses. All these measures should be clearly laid down by regulation in order to avoid con-

fusion and indecision. In cases where the regular occupation of the position appears impossible, the regulation should permit all different ways of unlimbering, and should also connect therewith all measures against cavalry attack.

10.—In Field Artillery it is necessary to distinguish four different formations, viz., "ordinary marching," "marching formation for battle," "preparatory" and "fighting." In the two former the battery at war strength forms two columns—in the first column its fighting line with the due proportion of wagons, and in the 2nd column the échelon of wagons. In the preparatory formation the battery is drawn up in two lines, the 1st line being the fighting line, with one wagon per section in rear of the centre of each section, and in the 2nd line the wagon échelon. The distance between the 1st and 2nd line must be such that the échelon can always follow the battery without running the risk of being separated from it; at the same time, not so close as to necessitate its having to retire when the fighting position is occupied. In fighting formation the fighting line unlimbers, having its wagons in rear of the centre of the sections and the limbers in the 3rd line, either at full intervals in rear of the flanks, or in section columns, as described above. The wagon échelon is drawn up as far as possible under cover, not more than 700 yards in rear of the battery.

11.—The replenishment of ammunition in the battery should be so organised that officers in the fighting line need never trouble themselves about what is taking place in their rear, but may always be sure that the échelon is following ready to replace ammunition and casualties.

12.—Batteries forming a regiment are manœuvred as if they were entirely independent. Each of them directs itself solely by its commander, unless special orders are given to dress by the centre or flanks of a line. Flexibility and rapidity of manœuvre depend beside this on (*a.*) the liberal use of close intervals, which permits a considerable lessening of the extent of front; (*b.*) on the continual conforming to the movements of the head of the columns by units in rear. These movements lend themselves to every change of direction and enable the column leaders to select by their own observation their line of advance, and the commander of the regiment to change direction instantaneously. These principles give special importance to the line of section columns, especially at close intervals. This formation of a regiment gives the commander the greatest degree of flexibility and should be used in all cases, except where the closing in of the batteries on a limited space of ground would be dangerous.

The deployed line of a regiment has little flexibility and is not easily commanded: nevertheless, the regulations should enjoin it in proportion to its importance in those cases when it is a question of occupying or retiring from a position under fire.[1] *Section* column is very flexible, but not easily commanded, and clumsy to deploy from. *Line of columns* possesses the points of a deployed line and the corresponding columns. The regulations should preserve this formation, because, on broken ground and among other troops, it offers many advantages in changing position to the front or rear. *Quarter column* of batteries is purely a parade formation.

13.—In order to make the fighting formation of the regiment as flexible as possible, batteries should be drawn up in échelon, which enables them to take up position in correspondence with the features of the ground.

The échelon may be regular or irregular, according to circumstances, but in every battery, as a rule, the line of guns should be perpendicular to the line of fire, in order not to embarrass the occupation of the position and the work of the gun-layers.

The échelon formation on a position may be made in two ways, which should be laid down by regulation. In the first of these the commanding officer orders a simultaneous advance to the position: in his preparatory orders he settles the

[1] *i.e.*, regimental column of sections.

depth and direction of the échelon, and personally establishes the directing battery. As a rule, the échelon should be a regular one, in order to avoid explanations at the last moment. The Commanding Officer fixes it, taking into consideration the direction of the wind (with black powder), the configuration of the ground, and, in connection with this latter, the hindering of the enemy's ranging. This method excludes all reconnoitring by the Battery Commanders, and should only be employed in circumstances when the reconnoitring is either useless or impossible.

In the second method, the reconnoitring by Battery Commanders must be considered indispensable, in order to benefit as much as possible by the features of the ground: each Battery Commander himself choses and marks out the position of his guns. Each battery takes up its position independently.

The échelon formed in this manner varies, but the general rule is that two adjacent batteries should have an interval equal to the depth of the échelon, in order not to interfere with each other's fire.

14.—The regiment marches and fights on the same principles as have been laid down in regard to a single battery. Its formations have the same name and are applicable to the same circumstances. In ordinary marching formation the batteries follow each other, having their wagons of the fighting line immediately in rear of the sections, and the wagon échelons in rear of their batteries in "field column of route:" the fighting lines of the batteries follow each other at the head of the column, and the wagon échelons follow in rear under the general charge of an officer.

In the preparatory position and in action the *three* fighting lines of a battery form the first line and the collected échelons the second. The regulations should lay down with exactness the connection to be kept up between the two lines, and also how the replenishment of ammunition should be carried out between these two lines and the ammunition columns. Although the échelons are collected under one command when the batteries are acting together, each échelon nevertheless maintains individual connection with his own battery. If one battery is detached, its échelon immediately re-establishes its independence and follows its battery in all its movements. Besides this, the regulations must contain instructions for the manœuvring of several regiments together. These instructions, of course, can be only of a general character, and will relate principally to the connection which must be established by means of orderlies between the higher commanders and the means by which the direction of these latter can be maintained over the fighting units and the ammunition supply.

Rules for Command.

The accurate execution of a manœuvre depends on the combined action of the commander and the guides. The Commanding Officer orders the execution of this or that movement in accordance with his object. The guide secures the direction and pace, the guns conform their movements to the movements of the guide, and direct themselves solely by him. When the movement begins, the guide's principal duty is to keep his horse in the right direction and at the right pace. In changing from one formation to another the guide directs the "base-body" and the remainder conform to the latter. In this way the guide can accurately give the desired direction to the new formation and, even if ordered, or if circumstances require it, change its direction whilst the movement is being carried out. As a rule, every Commanding Officer is the guide of his regiment, every Battery Commander of his battery, every Section Commander of his section, and every No. 1 of his gun. The Commanding Officer, when he thinks necessary, can hand over the leading to one of his officers. To do this he raises his sword perpendicularly, and gives the order to the officer detailed for this duty "Lead," giving him, if necessary, a point to move on. When he

wishes to resume the direction himself, he takes up his place and puts his horse in the proper direction, and, raising his sword as before, gives the order, "Follow me." In the drill of a section or battery, orders are given, as a rule, verbally or by signal. Orderlies are employed only with the battery at war strength, a regiment, or larger bodies. When giving words of command the Commanding Officer of any body of artillery turns towards it. If his command is in column he rides forward clear of one of the flanks so as to be well seen by his subordinates; as a rule, he should be on the directing flank. When moving he rides far enough in front to be able to give the executive word of command before the leading portion reaches him. If by any chance it is necessary for the Commanding Officer to give a verbal command when in rear of his command in column of sub-divisions, the order must be repeated by all the Nos. 1, who must, if necessary, ride forward to the No. 1 in front of them for this purpose.

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Maintainance of Connection and Transmission of Orders by means of Orderlies.

All orders given to orderlies should be sufficiently concise to be committed to memory, word for word, and so delivered. If the order is to be immediately carried out, it ends with the word "Execute." Orderlies must be carefully trained to the precise transmission of orders without confusion. Before riding off with a message orderlies should repeat it aloud so as to assure the officer sending it that it is clearly understood by them. Orderlies should proceed at a walk for the first 15 paces and then at a gallop, returning at a trot.

Paces.

The following paces are employed in Field Artillery:—In Field batteries—the walk, the trot of manœuvre and the trot-out; in Horse batteries—the walk, the trot of manœuvre, the gallop, and the full gallop. The rate of the walk is 125 paces a minute, or 3·3 miles an hour; the rate of the trot of manœuvre is 300 paces a minute, or 8 miles an hour—of the trot-out and the gallop, approximately, 500 paces a minute, or 13 miles an hour—the full gallop about 600 paces a minute.

On the evenness of the pace depends the accuracy of the movement, and the Commanding Officer of every unit, in his *rôle* as guide, must give all his attention to this point. When the pace is not specially indicated, movements from the halt are carried out at the walk, and when moving, at the pace of the movement. All changes of pace are carried out gradually. Field batteries should only use the "trot-out" on very favourable ground, in movements in line, and in deploying. Horse batteries must be able to keep their direction and manœuvre at a gallop, and the time for which they can keep up this pace depends on the preparation and training of the horses.

Dressing.

Dressing, as a rule, should be by the commander of the unit, who acts as its guide. In moving in line the commanders of both centre sections in 8-gun batteries preserve the proper distance and interval from the commander of the battery: in 6-gun batteries the commander of the centre section follows in rear of the Battery Commander at the proper distance. With a regiment in line the commanders of flank batteries dress by the commander of the centre battery, who keeps the distance from the Commanding Officer. Dressing in wheeling about, and wheels right or left, is to the hand to which the wheel is made.

Connection between different units, and also between the fighting lines and their échelons.

This is carried out by means of a special staff of orderlies, as described above.

Every orderly must always attach himself to the unit or officer whose messages he is to carry: on the march the orderly follows his battery or his échelon. The regulations lay down the moment when the orderly must take up his post for action and when he should leave it. The duty of establishing the connection at the proper moment rests with the subordinate unit: thus, each battery sends its orderly to the Commanding Officer of the regiment, and each wagon-échelon sends an orderly to its commander in the fighting line. Although the regulations lay down that Nos. 1 should be employed for this duty, this is not an absolute rule, and bombardiers and gunners may be employed, provided they have suitable qualifications. Each orderly may be told off to keep up one particular connection, and he should occupy himself solely with keeping up the connection between the two commanders he is told off to. The duties of orderlies must not be mixed up with any other duties whatever, and when he is carrying an order no one should divert him from this object. He must always know where to find the two commanders whom he connects, or, if they are moving, their direction and pace. With this object he must always notice the road by which he goes, making use, if necessary, of directing points, so as to find his way back without hesitation. If, whilst an orderly is carrying a message from one commander to the other, one of these latter has changed his position, the orderly should (1), without losing sight of the place where the absent commander was before, try to find him, or (2), if he cannot do this, return to the commander whom he left last and immediately inform him of the rupture of connection. On the other hand, every commander who is suddenly obliged to move from his place should (1) inform the other commander with whom he is in connection of his new position; (2) take steps to re-establish the broken connection as quickly as possible by leaving on his former position a marker, with orders to direct all orderlies arriving there to his new position.

Comparative Value of Different Formations.

The movements available in changing from one formation to another do not all present similar advantages as regards flexibility and simplicity. They are also subject to different conditions of time and distance, and, lastly, they do not in the same degree facilitate the reception of orders and maintenance of direction. Officers must accustom themselves to compare the spaces necessary for the execution of different movements, and in this way they will soon learn the necessity of avoiding certain movements which require too much time and too long a use of rapid paces.

Line at full intervals when moving is a formation that is hard to direct and has little depth. On the other hand, *columns* possess a very high degree of flexibility. Manœuvring at close intervals possesses great advantages. Close intervals make the body compact and easily directed, and may be freely used outside of the sphere of the enemy's fire. By opening and closing the intervals it is possible to pass all obstacles met with. Artillery should be frequently practised in passing every kind of obstacles, and where these do not exist they must be constructed artificially.

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Artillery Reconnaissance.

Every fighting position for artillery must be carefully reconnoitred in advance by Artillery Commanders. The success of the impending artillery action depends on this detailed and carefully executed reconnaissance, which is one of the most important points in the handling of Field Artillery in war. The reconnaissance consists—under conditions fixed by the general tactical objects of the battle, of locality, and of the position and action of the other arms and the position of the enemy—in (1) choosing the best fighting position for the batteries; (2) finding

out the best road to it; (3) using the best means of bringing the batteries to the position and of distributing the guns on it. The first point for consideration in choosing a fighting position, is the fighting qualities of the position itself, and then its facilities for cover for the guns, limbers, and wagons; and, lastly, the local facilities it offers for a screened advance of the batteries on to the position.

The information on which to base his decision is brought to the Commanding Officer by means of scouts—he is not in a position personally to collect it, and must for this purpose make use of the officers and lower ranks forming his staff. The artillery reconnaissance is carried out by the Chief of the Artillery if possible, with the assistance of the subordinate commanders down to Battery Commanders inclusive. In retreat the reconnaissance of the next position is entrusted to an officer, as the Commander of the Artillery must remain in the fighting line.

The artillery reconnaissance is carried out with a certain consecutiveness depending on the number of batteries or regiments which are to be brought together into the position. The *general* position for the artillery is usually indicated by the commander of the army or division, who at the same time gives orders to the artillery leader as to the nature of the action he expects from the artillery in the impending fight. If a very large number of batteries are to be brought into position at once, the artillery leader distributes the duty of reconnaissance among the brigade and regimental commanders, merely dividing the *general* position between them. The time for summoning the commanders of brigades and regiments to reconnoitre their future positions rests with the leader of artillery and is fixed by the circumstances of the battle. The Regimental Commanders call out their Battery Commanders to reconnoitre generally immediately on the arrival of the batteries at the preparatory position. A defensive position is reconnoitred on the same principles, with the difference that time is here no object, and this applies also to a reconnaissance of a position in the attack of a defensive position previously occupied by the enemy. When in view of the enemy, the reconnaissance must be carried out as secretly as possible, all possible measures being adopted to avoid prematurely drawing the attention of the enemy to the intended position. In the actual examination of the position itself, the Artillery Commander having dismounted and left his staff under cover, proceeds on foot, endeavouring not to show himself. The reconnaissance must be carried out as thoroughly and systematically as possible, but need not take long if artillery officers are accustomed to read maps correctly and to make out their position at first glance. When the reconnaissance is finished Regimental Commanders remain on the fighting position, the Battery Commanders return to their batteries, which may have been previously ordered to advance. In advancing to a second position the reconnaissance is carried out on the same principles. The senior Artillery Commander, anticipating the order to advance, should in good time send one of the officers of his staff to reconnoitre the positions in front and the roads to them. At the right moment he himself rides forward to the indicated position and gives orders for the distribution and lines of advance of the regiments and batteries. He also judges the distance to the object, and sends his orderlies back to the batteries. The latter give the Commanders of Regiments and Batteries all necessary details regarding the position, target, and probable range, and during the advance act as guides to the batteries. Regimental and Battery Commanders may precede their batteries at a rapid pace on to the position, in order to receive there any later orders from the artillery leader.

Marking out the Fighting Position.

The fighting position should be marked out for each battery by its commander when the batteries advance on to it. Each commander marks for the centre or one of the flanks of his battery, placing his horse in the direction of the line of fire, but it is a better plan for Battery Commanders, after they have examined the

position selected for their battery, to mark one or both flanks, using their trumpeters for the purpose. Great care should be taken that the markers do not expose themselves to the enemy before the batteries come up ; they should remain under cover till then.

The Halt in the Preparatory Position.

During the advance of the batteries to the fighting position, it is well to divide their approach to the sphere of action from their actual advance into action by a halt in a preparatory position. This is necessary to give time to the commanders to complete their reconnaissance of the fighting position, and to the batteries to collect and take all possible preparatory measures for opening fire as quickly as possible. This position should be screened from the enemy, and yet be as close as possible to the fighting position. The formation in this position should be either line or line of columns, the heads of columns being level with each other, so as to secure a simultaneous advance. The preparatory position is selected by the commanding officer during his reconnaissance, and he should leave an officer on it to give orders to the batteries as to their formation and other points.

The Approach of the Batteries to the Fighting Position.

This should be as much as possible screened from the enemy. If the line selected for the advance during the reconnaissance lies over very broken ground, on which it would be difficult to preserve the direction, it should be marked out. As far as possible roads should be made use of. If it is unavoidable to cross ground exposed to the enemy, it should be done at a rapid pace.

The Advance to the Fighting Position.

This should be carried out as much under cover as possible and simultaneously. On open ground, where possible, the advance should be made in line straight in the direction of the enemy, but at the same time the advance must always begin in such a formation as will allow the passage of the narrowest places on the line of advance, so as to avoid the necessity of forming column during the movement. For this reason column of sub-divisions,[1] as the most flexible and easily adapted to ground, is the most suitable for the advance over open ground intersected by obstacles.

Occupation of the Fighting Position.

Where possible the occupation of the position should be carried out under cover from the enemy and fire opened on him unexpectedly. The guns may often be unlimbered a little in rear of the position, and the guns run up by hand after the line of fire has been pointed out and the guns laid. In action the intervals between the guns need not be the same—every advantage should be taken of the ground for them. It will often be advantageous to unlimber to a flank in occupying a position, and all the guns of a battery need not unlimber in the same way, but should each take advantage of the ground.

[1] Presumably "line of sub-division columns."

(To be continued).

NOTES

FROM

CORRESPONDING MEMBERS.

GOLD MEDAL PRIZE ESSAY, 1894.

As the time for sending in Prize Essays is drawing near the Committee think it well to repeat the following note, first published in August, 1893 :—

The Subject approved for the "Duncan" Gold Medal Prize Essay, 1894, is as follows :—

"What is the best Tactical Organisation and System of Training massed Batteries of Horse and Field Artillery?"

The Rules for the Prize Essays now read :—

The Annual Gold Medal, when awarded, to be accompanied by an *honorarium* of £20; the Silver Medal by an *honorarium* of £10.

The candidates must be Officers of the Regiment who are members of the R.A. Institution.

Officers are requested to confine their Essays to about 16 printed pages of the "Proceedings;" other things being equal brevity will count towards success.

The Essays must be forwarded to the Secretary so as to reach him on or before the 1st of April.

Each Essay must be *type-written* in triplicate. The Essays must be strictly anonymous, but each to have a motto, and be accompanied by a sealed envelope with the motto written outside and the name of the writer inside; further, if the writer wishes to recover from the Committee part of the cost of type-writing his Essay he should state this fact in the same sealed envelope and write outside it, above the motto, "to be opened."

All the envelopes thus marked will be opened by the Secretary after the result of the competition has been announced, and he will send the writers the money for their type-writing expenses.

The Committee will allow a sum of £1 for type-writing each Essay.

The Essays will be submitted for decision to three Judges chosen by the Committee.

The Judges are empowered to recommend :—

1. That two Medals, one Gold and one Silver, be awarded, or
2. That only one Medal, Gold or Silver, according to the merit of the Essay, be awarded, or
3. That no Medal be awarded.

The names of the successful candidates will be announced at the Annual Meeting, and Medallists will be distinguished as such in all Lists, &c., issued from the Institution; and in the event of a University man gaining a Medal, a report of his success will be made to the University of which he may be a member.

The successful Essays will be printed and circulated to members by the Institution.

THE following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below :—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893 :—

Captains (*c*) and (*d*) ... price 1s. 1d.
Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

R.A.I "DUNCAN" PRIZE ESSAY, 1894.

THE Secretary has received an essay bearing the motto :—

"Exemplo plus quam ratione vivimus."

THE ROYAL ARTILLERY MEETING, 1894,

WILL TAKE PLACE AT

ALDERSHOT

ON

ON TUESDAY, APRIL 3RD

(UNDER NATIONAL HUNT RULES).

R.A. REGIMENTAL RACES.

The Royal Artillery Gold Cup value **100** sovs., with **50** sovs. to the winner, **20** sovs. to the second, and **10** sovs. to the third; for horses, the property of, and to be ridden by, Officers on full or half-pay of the Royal Artillery, that have never won a steeplechase value 90 sovs., and have been regularly hunted during the past season by their nominators or by some other Officer qualified to enter; 12 st. each; the winner of a steeplechase under 50 sovs. in value to carry 7 lb. extra, of two or more such races, or of one or more steeplechases value 50 sovs. to carry 14 lb. extra; no penalties for winners of regimental races; entrance 2 sovs., but starters free except the winner; three miles.

To close on Tuesday, March 13th, to Messrs. Wetherby, Messrs. Pratt & Co., or Lieut.-Colonel Toogood, Denham Court, Winchester.

The Welter Steeplechase of **50** sovs., with **10** sovs. to the second, and **5** sovs. to the third; for horses (not thoroughbred), the property of, and to be ridden by, Officers on full or half-pay of the Royal Artillery, or Officers who have retired from the Regiment, which have been regularly hunted during the past season by their nominators, or by some other Officer qualified to enter, and have never won a race of any description; 13 st. 7 lb. each; entrance 1 sov., but starters free except the winner; two miles and a half.

To close as above on Tuesday, March 13th.

The Light Weight Steeplechase of **50** sovs., with **10** sovs. to the second, and **5** sovs. to the third; for horses (not thoroughbred), the property of, and to be ridden by, Officers on full or half-pay of the Royal Artillery, which have been regularly hunted during the past season by their nominators, or by some other Officer qualified to enter, and have never won a race of any description; 11 st. 7 lb. each; entrance 1 sov., but starters free except the winner; two miles and a half.

To close as above on Tuesday, March 13th.

***In the above three races, the Stewards reserve to themselves the right to refuse the entry of any horse that, in their opinion, has not been regularly and fairly hunted.

A Consolation Hurdle Race of **25** sovs. for beaten horses in the regimental races; the second to receive 4 sovs. out of the race; 12 st. each; post entrance 1 sov.; two miles, over eight flights of hurdles.

CONDITIONS.

1. Except where otherwise specially mentioned, ten entries to be made for each race, or the race may be declared void.
2. The whole of the added money will be given for two starters, but one half only for a walk over.
3. Fees as allowed by Rule.
4. Colours not registered must be declared at time of entry, or to Messrs. Pratt & Co., 9, George Street, Hanover Square, London, W., by twelve o'clock noon the day before running.

STABLING AT ALDERSHOT.

There are good loose boxes at the Farnborough Commission Stables, adjoining the Queen's Hotel, North Camp, Farnborough, for which application should be made to the Manager. (Telegraphic address, "Spurs, Farnborough, Hants").

The charge will be 10s. per day of 24 hours, to include corn, hay, straw, and every requisite; or 5s. only if horses do not stop the night.

The following translation of a letter from a German officer in India to a German sporting paper, the "*Sportswelt*," should interest military readers:—

Calcutta,

20th December, 1893.

Sir,

A few days ago I read an article, entitled "The Hanover Case, Horse Racing," which appeared in Nos. 264 and 272 of your paper. Everybody who has, or has had, anything to do with sport knows how true this article is, and that sport has nothing in common with, and is an enemy of, gambling.

One side of the case is so very clear to me that it has induced me to write to you, being as I am now in India, and having thus the opportunity of seeing the English army's idea of sport, and also of being able to enjoy it personally.

Compared with the English, the German nation is suffering from an inordinate longing after good living, which has increased all the more because there is no healthy sport or healthy games to go hand-in-hand with it and check it as in England.

What I am writing concerns principally the officers of both nations. In Germany it is the custom to copy too much those above you. . . . . Everybody who does not go in for this kind of thing is looked down upon, and consequently many are compelled to live more or less above their means; they look about for some way of adding to their income, and have recourse to the quickest and easiest—namely, gambling.

The above is the cause of the encouragement of gambling. It is true that the passion for gambling is slumbering more . . . . . At the Riding Establishment, at Hanover, I have myself seen many of the officers under instruction sitting down at the gambling table who had absolutely no desire to play but who were compelled to do so in order to pay debts incurred by imitating the mode of living of their richer brother officers. The above explains the temptation to gamble held out to the large number of officers who are attached to the Riding Establishment at Hanover, and this is exactly what happens on a smaller scale amongst the officers in every regiment.

How is this to be remedied?

To totally prohibit a jolly, merry way of living is impossible. . . . . It would also be a sad state of affairs if the only object in life was to consider how best to fight or die. Far better to follow the example of the Athenians, namely, to enjoy life in its most beautiful and noble form, and, at the same time, to be always ready and prepared to face our enemies. . . . . The nation, in the present day, which follows the example of the ancient Greeks most is the English.

In England a glass of good wine is very much appreciated, and similar pleasures are just as much enjoyed there as in Germany. But healthy bodily sport is enjoyed still far more. Every Officers' Mess has, at least, a good ground for two tennis courts and, besides this, grounds for two or more games quite close to the Mess, similarly the N.-C.O's. Mess; and here, in India, every private family even has a tennis ground, and every Cavalry Mess a polo ground besides. Clubs for these purposes are formed where it is impossible for individuals to enjoy them, on account of want of space or from considerations of expense. "That's all very well for the wealthy English, but we poor Germans cannot afford all this," is said with a certain right. But much could be done in German Officers' Messes if some of the money spent in oysters and the almost daily champagne was expended for such healthy bodily recreation.

Facts speak better than "Ifs" and "Buts." A few days ago I saw a Colonel of a Regiment, at the head of twelve of his best officers, winning a quarter-mile handicap foot race; in another town I saw an Inspector of Artillery just beaten by a Colonel.

In Germany this sounds funny, and a good many will laugh at it; but these latter have never felt that sport gives activity and courage to dare anything; that it makes young and preserves youth; these also do not think that a regiment may be as keen as it likes, but, nevertheless, every opportunity to distinguish itself is allowed to slip by, because its commander does not keep young or enterprising.

Everybody who has had anything to do with sport knows what an invigorating effect the preparation for a race, or the race itself, has, not only on the circulation of the blood in the body, but also on mental work, and how enjoyment of life becomes now healthier for the mind and more refined in a good sense.

Everybody who knows what it is to see the morning dawning—and every true sportsman breathes in the fresh morning air, otherwise he is not a true sportsman—hates the lamplight on the green cloth, and the close air which hovers

around the green table, and longs for the refreshing sleep after the bodily, but enjoyable, fatigue of sport. Whoever has not felt this does not know what healthy sport is. Sport has nothing in common with gambling, it is the enemy of gambling. For that reason don't abolish sport or sporting games, don't prevent your children from going in for them, but give every facility for them in Germany, in order that the nation can go in for them, as far as time permits. This is the best way to prevent gambling, this is the best way to stop all the pernicious results in every direction which arise from a costly way of living and the many luxuries of present life.

"It is true we have gymnasiums" is asserted. Yes, that's all very well, but not enough. To begin with, gymnastics are compulsory for the school-boy, and, therefore, become monotonous for many a boy who feels he can not excel in them. But the prospect of victory, and the endeavour to win always spurs on and incites the individual or party, as the case may be.

Why not copy any good thing from other nations if it is good for us as well? We have ample proof in our German towns of how the Englishman goes in for sport of every description, and how he thereby hardens his body against cold and heat. The lightly-clad Englishman in Germany during our winter months is wonderful to our eyes, but the cause of this is a healthy and important one.

The small English nation, with its population of 35 millions, rules over a world of 340 millions. This the English manage, first by means of their all-powerful money, but last, and not least, by means of their excellent soldiers quartered abroad (service abroad makes the English far better soldiers than service at home). This degree of perfection is acquired by the troops, not by means of the laborious and almost painful disciplinary training in every military branch on account of which the German Army is held up as an example to all nations, but by sport and games which give the individual the most perfect training. Sport prevents the soldier from getting into an easy way of living, and specially keeps him away from drinking spirits, so dangerous in hot countries, also from gambling and so on; it trains the body to perform long marches in spite of the exceptional Indian heat, namely, marches of between 60 to 80 kilomètres in case of cavalry, and from 20 to 25 kilomètres in case of infantry, which are carried out day by day in marching order. And this excellent performance is not done by a few picked men or horses, but by whole regiments during the annual change of stations, which takes place on purpose to accustom the troops to route marching.

In conclusion, I would once more impress upon us Germans:—Don't abolish sport, and in order to protect the German Army against gambling and demoralisation give as many opportunities as possible for it, in order that the soldier and officer may give body and mind to it keenly, fondly, and passionately.

CAPE TOWN.

On New Year's Day the married officers of the Royal Artillery and their wives were entertained at dinner in the R.A. Mess by the bachelors; a very pleasant evening was spent, and the fife and drum band of 8 Company Southern Division played an enjoyable selection of music during dinner.

The R.A. here suffer greatly from want of proper Mess accommodation. There has been no increase in it since the days when only a part of a battery were quartered in the Castle. Now there are 13 officers of the Regiment belonging to it, and a host of honorary members using it, and the Mess consists only of a dining-room that can seat 14, and an anteroom that will barely hold a dozen; there is neither billiard-room nor lavatory. Nearly all the foreign men-of-war that touch at the Cape call in the R.A. Mess, and it is a very difficult matter to entertain them or anybody else in such quarters.

Cricket is now in full swing, but the gunners do not shine at the game; however, in the past football season the company carried all before them in the Association game. There are two Challenge Cups competed for here every year open to all clubs in the Peninsula, and the company won them both, but only after a hard struggle with the "Black Watch" team in the final ties. The Challenge Cups, very handsome trophies, now adorn the dinner table in the Mess.

The annual practice and the inspections for the year have just been completed, and 8 Company Southern have gained a first-class prize in the competitive.

Lieut. Tancred, late Divisional-Adjutant of the R.A. here, is still at Buluwayo with the Bechuanaland Border Police, to which he was attached with the Maxim guns; he is reported to have done very good work in the campaign.

Major Morrieson has just been appointed to the command of the company, but has not yet joined.

OBITUARY.

Lieut.-Colonel B. F. Domvile (retired), died at Dinard, France, on 26th January, 1894. He joined the Regiment as Lieutenant, 16th August, 1864; became Captain, 30th May, 1877; Major, 16th November, 1883; Lieut.-Colonel (half-pay), 25th July, 1891, and retired on 5th August, 1891. Lieut.-Colonel Domvile served in the Afghan War, 1879–80, and was present at the operations in the Mazina Valley, mentioned in despatches (medal).

Lieut.-Colonel W. P. Georges, whose death occurred at Aberdeen on 30th January, 1894, was commissioned as Lieutenant, 17th December, 1862; became Captain, 28th October, 1875; Major, 18th October, 1882, and Lieut.-Colonel, 13th February, 1891.

Major-General F. W. C. Ord, died suddenly in the hunting field on 6th February, 1894. He was commissioned as 2nd Lieutenant, 19th June, 1844; became Lieutenant, 1st April, 1846; 2nd Captain, 1st April, 1852; Captain, 29th June, 1855; Major, 21st February, 1864; Lieut.-Colonel, 27th February. 1866; Colonel, 27th February, 1871, and retired on full pay with hon. rank of Major-General, 1st May, 1880.

Lieut. (D.O.) J. G. Rogan died at Gravesend on 25th January, 1894. He was commissioned from the ranks as Lieutenant, 30th April, 1890.

DIARY OF FIXTURES.

MARCH.

Day of the Mth.	Wk.	Regimental.	Cricket, &c.	Private.
1	Th	... ...	... ...	... ...
2	F	... ...	... ...	... ...
3	S	... ...	... ...	... ...
4	S	... ...	... ...	... ...
5	M	... ...	... ...	... ...
6	T	... ...	... ...	... ...
7	W	R.A. Band Concert at 9 p.m.	... ...	... ...
8	Th	R.A.I.Committee 'At Home' at 4 p.m. Major Holden's Lecture on "Chicago," at 5 p.m.	... ...	... ...
9	F	... ...	... ...	... ...
10	S	... ...	... ...	... ...
11	S	... ...	... ...	... ...
12	M	... ...	... ...	'Ubique' Royal Arch Chapter meets at "Criterion."
13	T	... ...	... ...	... ...
14	W	R.A. Band Concert at 3 p.m.	... ...	... ...
15	Th	... ...	... ...	... ...
16	F	... ...	... ...	... ...
17	S	... ...	... ...	... ...
18	S	... ...	... ...	... ...
19	M	... ...	... ...	... ...
20	T	... ...	... ...	... ...
21	W	R.A. Band Concert at 3 p.m.	... ...	... ...
22	Th	... ...	... ...	... ...
23	F	Good Friday.	... ...	... ...
24	S	... ...	... ...	... ...
25	S	Easter Day.	... ...	... ...
26	M	Bank Holiday.	... ...	... ...
27	T	... ...	Lincoln Races.	... ...
28	W	... ...	... ...	... ...
29	Th	... ...	Liverpool Races.	... ...
30	F	... ...	Grand National	... ...
31	S	... ...	... ...	... ...

APRIL.

1	S	... ...	... ...	... ...
2	M	Senior Class and Firemasters' Class join Artillery College.	... ...	... ...
3	T	... ...	R.A. Races at Aldershot.	... ...
4	W	R.A. Band Concert at 9 p.m.	... ...	... ...
5	Th	... ...	... ...	... ...
6	F	... ...	R.A. *v.* R.E. Racket and Billiard Matches, at Chatham.	... ...
7	S	... ...	R.A. *v.* R.E. Racket and Billiard Matches, at Chatham.	... ...
8	S	... ...	... ...	... ...
9	M	... ...	... ...	... ...
10	T	... ...	... ...	... ...
11	W	... ...	... ...	... ...
12	Th	.. ...	... ...	... ...

APRIL.—*Continued.*

Day of the Mth	Wk.	Regimental.	Cricket, &c.	Private.
13	F	R.A. Band Concert at St. James's Hall.	... ...	... ...
14	S	Long Course leaves Woolwich	... ...	... ...
15	S	... ...	... ...	... ...
16	M	... ...	... ...	... ...
17	T	... ...	Epsom Spring Meeting begins	... ...
18	W	... ...	... ...	... ...
19	Th	... ...	... ...	'Ubique' Mark Lodge of Mark Master Masons meets at "Criterion."
20	F	... ...	... ...	... ...
21	S	... ...	... ...	... ...
22	S	... ...	... ...	... ...
23	M	... ...	... ...	... ...
24	T	... ...	Newmarket Craven Meeting begins.	... ...
25	W	... ...	... ...	... ...
26	Th	... ...	... ...	... ...
27	F	R.A. Band Concert at St. James's Hall.	... ...	... ...
28	S	... ...	... ...	... ...
29	S	... ...	... ...	... ...
30	M	... ...	... ...	... ...

MAY.

1	T	... ...	... ...	... ...
2	W	... ...	R.A. Woolwich *v.* R.N. College, at Greenwich.	... ...
3	Th	... ...	... ...	... ...
4	F	... ...	... ...	... ...
5	S	1st Div. F.A. (Aldershot) reaches Shoeburyness.	R.A. Woolwich *v.* R.A. Shoebury, at Shoebury.	... ...
6	S	... ...	... ...	... ...
7	M	Position-Finding Class joins Artillery College.	... ...	... ...
8	T	... ...	Newmarket 1st Spring Meeting begins.	... ...
9	W	... ...	... ...	... ...
10	Th	... ...	... ...	... ...
11	F	... ...	... ...	... ...
12	S	2nd Div. F.A. (Aldershot) reaches Shoeburyness, and 1st Div. R.H.A. (Aldershot) reaches Okehampton.	R.A. Woolwich Officers *v.* N.C. Officers.	... ...
13	S	Whit Sunday.	... ...	... ...
14	M	Bank Holiday.	... ...	'Ubique' Lodge Meeting at "Criterion," installation of W.M.
15	T	... ...	... ...	... ...
16	W	... ...	... ...	... ...
17	Th	... ...	... ...	... ...
18	F	... ...	... ...	... ...
19	S	3rd Div. F.A. (Weedon) reaches Shoeburyness.	R.A. Woolwich *v.* R.M.C., at Sandhurst.	... ...
20	S	... ...	... ...	.. ...
21	M	... ...	... ...	... ...
22	T	... ...	Newmarket 2nd Spring Meeting begins.	... ...
23	W	... ...	... ...	... ...
24	Th	... ...	... ...	... ...
25	F	... ...	R.A. *v.* Aldershot Division, at Aldershot.	... ...
26	S	4th Div. F.A. (Ipswich) reaches Shoeburyness.	R.A. *v.* Aldershot Division, at Aldershot.	... ...
27	S	... ...	... ...	... ...
28	M	... ...	... ...	... ...
29	T	... ...	... ...	... ...
30	W	... ...	... ...	... ...
31	Th	... ...	... ...	... ...

JUNE.

Day of the Mth.	Wk.	Regimental.	Cricket,&c.	Private.
1	F	... ...	R.A. *v.* Greenjackets, at Winchester.	... ...
2	S	5th Div. F.A. (Colchester) reaches Shoeburyness.	R.A. *v.* Greenjackets, at Winchester.	... ...
3	S	... ...	... ...	... ...
4	M	... ...	... ...	... ...
5	T	... ...	Epsom Races begin.	... ...
6	W	2nd Div. F.A. (Sheffield) reaches Okehampton.	The Derby.	... ...
7	Th	... ...	... ...	... ...
8	F	... ...	The Oaks.	... ...
9	S	... ...	R.A. Woolwich *v.* R.A. Shoebury, at Woolwich.	... ...
10	S	... ...	... ...	... ...
11	M	... ...	... ...	... ...
12	T	... ...	... ...	... ...
13	W	... ...	R.A. *v.* Household Brigade, at Chelsea.	... ...
14	Th	... ...	R.A. *v.* Household Brigade, at Chelsea.	... ...
15	F	R.A.I. Annual General Meeting at R.U.S.I.	REGIMENTAL DINNER.	
16	S	... ...	R.A. Woolwich *v.* Blackheath, at Blackheath.	... ...
17	S	... ...	... ...	... ...
18	M	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich.	... ...
19	T	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich. Ascot begins.	... ...
20	W	... ...	... ...	... ...
21	Th	... ...	... ...	'Ubique' Royal Arch Chapter meets at "Criterion," installation of Principals.
22	F	... ...	R.A. *v.* B.B., at Woolwich.	... ...
23	S	6th Div. F.A. (Woolwich) reaches Shoeburyness.	R.A. *v.* B.B., at Woolwich.	... ...
24	S	... ...	... ...	... ...
25	M	... ...	... ...	... ...
26	T	... ...	... ...	... ...
27	W	... ...	R.A. *v.* Yorkshire Gentlemen, at Woolwich.	... ...
28	Th	... ...	R.A. *v.* Yorkshire Gentlemen, at Woolwich.	... ...
29	F	... ...	... ...	... ...
30	S	... ...	... ...	... ...

NOTES

FROM

CORRESPONDING MEMBERS.

The Annual General Meeting of the R.A. Institution will take place at 3 p.m. on Friday the 15th June in the Lecture Theatre of the Royal United Service Institution, Whitehall.

The Committee intend to propose the following alteration in the Rules:—

Para. 3 of Rule II. on page 2 to read—"The Committee shall have power to elect as honorary Members such gentlemen connected with Naval and Military arts and sciences as they from time to time think fit; and for short periods, officers of the Army and Navy who may be temporarily in the garrison or neighbourhood," instead of as it now stands.

After the business of the Institution is finished the R.A. Charities, R.A. Games' Fund, and R.A. Cricket Club will be considered.

Anyone wishing to bring to the notice of the meeting any point concerning one of these funds or club is requested to communicate with the Hon. Secretary of such fund, Woolwich.

It is presumed that by this time a large majority of artillery officers have read the greater part, if not all of the "Army Book of the British Empire," by Lieut.-General Goodenough, C.B., and Lieut.-Col. Dalton, aided by various contributors.

More or less lengthy criticisms of it have appeared in print, and it is not our intention to add another to the number. It is enough for the purpose of these "Proceedings" to simply record our satisfaction that a book, which has excited such Army wide interest and evoked such a chorus of approval, has been compiled, and for the most part written, by officers of the Regiment.

We have now, for the first time, access to a hand-book of information; not only on the broad principles which govern the administration of the army, but also on the historical causes which have determined them, with a considerable amount of detail which the application of these principles requires.

It must, we fear, be acknowledged that great ignorance has hitherto prevailed among the officers of the army as to the system under which the various Corps and Departments, other than their own, are organised and administered. It does not always fall to the lot of a British officer to serve with a force in which all these Corps and Departments are represented; and it may be that many of us, when our good fortune has placed us with the army in the field, have for the first time made acquaintance with the special duties which the component parts of a field army are called upon to perform for the common good.

There used to be some excuse for this ignorance, as information on these points was by no means ready to hand. Now there is none: and we submit, the thanks of the army are due to General Goodenough and Colonel Dalton for having given us a book of such professional value and, we may add, of such absorbing interest.

THE following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below :—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893 :—

Captains (*c*) and (*d*) ... price 1s. 1d.
Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

R.A.I "DUNCAN" PRIZE ESSAY, 1894.

THE Secretary has received in addition to the one mentioned in March "Proceedings," Essays bearing the mottoes :—

"Vœ victis."
"Mens agitat molem."
"War is the harvest of peace."
"Certum voto pete finem."

BOOKS RECOMMENDED FOR THE STAFF COLLEGE AND PROMOTION EXAMINATIONS.

BY

LIEUT.-COLONEL EDEN BAKER, R.A.

[*Always follow closely the Syllabus in the Queen's Regulations.*]

MILITARY LAW.

LIEUTENANTS.—Army Annual Act, 1893, also 1894 when published.
Army Act, 1893 Edition. Parts I., II., and V. (Paras. 175 to 184).
Rules of Procedure, 1893.
Reserve Forces Act, 1882.
Queen's Regulations, 1893. Sections VI. and XIX.
Military Law, by Lieut.-Col. Pratt. 7th Edition, 1892. (A new Edition is now in the Press).

CAPTAINS, IN ADDITION TO THE ABOVE:—

Army Act, 1893 Edition. Parts III., IV., and V. (Paras. 185 to 190), and Schedules.
Militia Act, 1882.

FIELD FORTIFICATION.

Instruction in Military Engineering. Part I., Field Defences 1892 (*omit* fougasses and large inundations.)
Manual of Elementary Field Engineering (*omit* Sections 12 to 15, 18, 20).
Defence and Attack of Positions, by Colonel Schaw. 3rd Edition. *Read* Chapters 5, 7, 8 and 9.

PERMANENT FORTIFICATION.—*Staff College only.*

Text-book of Fortification for use at R.M.A., Woolwich, 1878. Part I., pages 132 to 191; Part II., pages 1 to 108 and 138 to 145.

MILITARY TOPOGRAPHY.

Text-book of Military Topography, 1888 (*omit* Sections 13 to 24 and 26 to 28).
Short Notes on Tactics and Reconnaissance, 1887, by Major J. R. J. Jocelyn, R.A. *Read* pages 65 to 81 and 84 to 94.

TACTICS.

Infantry Drill, 1893. *Read* the tactical part on pages xxiv, xxvi, 11, 50, 51, 87, 90, 94 to 192, 244 to 249.
Short Notes on Tactics and Reconnaissance, 1887, by Major Jocelyn, R.A. *Read* pages 7 to 62, but note that Infantry formations have been altered by Infantry Drill 1893 and Artillery Intervals and Distances by Field Artillery Drill, 1893. For Lieutenants Promotion Examination *read* only up to heading 15.
Minor Tactics by Colonel Clery. 12th Edition. *Omit* examples except for the Staff College Examination.
Preliminary Tactics, by Major Eden Baker. 1892. *Read* Ammunition Supply (the Battery Supply System has been altered), Time and Space (note that the following pages have been altered:—last line page 45, nearly all page 46, top half of page 48, and on page 49 lines 6 to 16 and 29 and 30), and Marches. *Read* also pages 82 to 91, and 140 to 152.

ARTILLERY.—*Lieutenants R.A. for Promotion Examination.*

Text-book of Gunnery, 1887. Chapters I., II., XII., XIV., and XVII. (A new Edition will be out shortly).
Treatise on Service Ordnance, 1893.
Treatise on Military Carriages, 1888. (A new Edition is now in the Press).
Treatise on Ammunition, 1892.
Regulations for Magazines, &c., 1887. (A new Edition is now in the Press).
Manual of Field Range-finding, 1890. } Alternative.
Hand-book for the Depression Range-finder, 1893. }
Field Artillery Drill, 1893. For Horse and Field Batteries only.
Garrison Artillery Drill, 1891–92. } For Garrison Artillery only.
Siege Artillery Drill, 1891. }
Handbook for Field Service, Vol. I., Field Artillery. *Omit* Parts I.; IV.; VII., 1 and 3; VIII., 2 and 3; IX., 2 and 3; X.; XI., 2, 7 and 10. Now being rewritten.
Preliminary Tactics, by Major Eden Baker, 1892. *Read* pages 171 to 174, 178, 179, and Chapters V. and IX.

ARTILLERY.—*Volunteer Officers (Captains and Lieutenants).*

Official Handbooks of Guns on which examined.
Field Artillery Drill, 1893.
Garrison Artillery Drill, 1891.
Handbook for Field Service. Vol. I., Field Artillery. As for Lieutenants R.A.

STAFF COLLEGE ENTRANCE EXAMINATION, MAY, 1894.
MILITARY HISTORY.

Vide Army Order 138, August 1893, and 169, October, 1893.

Officers going up for the Staff College Examination are recommended to read all Magazine Articles, Lectures, &c., that refer to Field Subjects.

ARTILLERY COLLEGE, WOOLWICH,
March, 1894.

DOVER.

SINCE last "Notes" the following changes have taken place:—Colonel Burgmann has assumed command *vice* Major-General Lloyd, C.B., appointed D.A.G., R.A.; Captain P. T. Cooper has joined No. 2 (Major Fraser's) Company, *vice* Captain J. P. DuCane, appointed Adjutant of the Norfolk Artillery; Captain J. McCall Maxwell and Lieut. Tomkins have been ordered to Newhaven on relief; Lieut. H. M. Barnes has been ordered to Rangoon, and Lieut. Wailes has been posted to and joined the Depôt; Captain E. Fountain has assumed command of the District Establishment *vice* Webster, ordered to Malta.

Major-General Lloyd, C.B., was entertained at dinner on 24th February, in the R.A. Mess, when 31 Gunners assembled to say "good-bye," including three from Shorncliffe. In his farewell speech, General Lloyd remarked that the offer of his appointment came as a very great surprise to him, that he had looked forward to nothing better than ending his time in Dover; that he accepted the high honor, fully determined to do his best in promoting the welfare and efficiency of the Regiment. The fact of his appointment must be regarded as showing that it is the desire of those in authority to give a proof of their desire to end for ever, the dark days of the Garrison Artillery, by appointing to one of the highest positions in the service, one who has served almost entirely in that branch.

Lieut.-General G. G. Pearse, C.B., R.H.A., has presented to the Mess a photograph of Major-General Elwyn, who commanded the R.A., South-Eastern District, from 1866 to 1868. The Mess Committee are very grateful to General Pearse for the trouble he has taken to obtain this portrait, which completes the series from 1860, the year when this Mess was formed, up to the present time. The Mess Committee also record with gratitude the gift of a box full of books to the Mess Library, by Major Morrieson.

The "Long Gun," or Queen Elizabeth's "Pocket Pistol," has been moved to a new site in the bend of the road opposite the south end of the canteen, to make room for a 6-in. B.L. gun on H.P. mounting.

HALIFAX, N.S.

IN the Temiscouata County of New Brunswick, early last September, 2nd Lieut. F. W. Mackenzie and his brother, Mr. C. A. Mackenzie, shot two very fine stag moose. The greatest span of their antlers measured 45½ and 44 inches, and their estimated weight was 1200 and 1150 pounds. They are the largest heads which has been secured by any R.A. Officer from Halifax for many years. Both moose

were killed from canoes; the first was "*called*" out of the woods into the water by night; the second was come upon by chance, by day, when the sportsmen were paddling into the Tuledi Lake, by the narrows connecting it with Sugar Loaf Lake; when first seen this moose was standing in the lake, knee deep, eating water-lillies. The hunter, a French trapper by name of Lucas, was in one canoe, and the Messrs. Mackenzie in another. The party was out for a month, at night they slept in a canvas lean-to; they shifted their camp, on an average, four days a week.

The dining members of the R.A. and R.E. Mess gave a small dance at Maplewood, at which about 100 persons were present; it was by way of a substitute for the R.A. and R.E. Annual Ball, which was not given in 1892 and did not take place in 1893. The Maplewood dance was held on 13th October, a date which commemorates the 6th anniversary of the arrival at Halifax of three Batteries, R.A., and one Company, R.E., *per* H.M.S. *Himalaya*, in 1887, and one which is jestingly known as "Muffin Day."

Lieut. Marsh is on five months' leave, visiting a brother in British Columbia, since 28th October.

Captain Boileau returned from his two month's trip to the Pacific Coast, *viâ* the Chicago Exhibition, a few days before Christmas, having travelled 7482 miles by rail only.

Lieut.-Colonel Saunders left the station for good on 23rd December, Major Bor, R.E., on 27th January, and Captain Dopping-Hepenstal, R.E., and Captain Fasson, R.A., on 9th December; all much regretted. On each occasion a farewell dinner was given at the Mess, and the time honoured custom adhered to of a parting shot from the brass gun on the side-board being fired by the junior R.A. subaltern present.

The engagement of marriage is announced, of Captain Duffus to Miss Corbett, of Halifax, N.S.

A large party from Halifax attended the Quebec Winter Carnival during the week ending 3rd February, consisting of General Montgomery-Moore, Captain and the Misses Colborne, Major and Mrs. Apsley Smith, Captain and Mrs. Lowe, and Miss Haddan, Captain Boileau, Captain Mills, R.E., and Lieutenant Elliott, R.A. They put up in the new C.P.R. Hotel, called the Château Frontenac, which is a splendid building beautifully situated on the Dufferin Terrace, overlooking the St. Lawrence and, indeed, the whole surrounding country. There were the usual carnival attractions of an ice fort, ice statues, a fancy drive, skating in fancy dress, a ball, etc., but a novelty, and a very interesting one, was found in a field day by the Militia Infantry on snow shoes, supported by two 9-pr. field guns on runners, horsed and manned by the Royal Canadian Artillery. The operations took the form of an attack on the Citadel across the historic Plains of Abraham. After this was concluded the troops, led by Major-General Herbert, C.B., marched past the Governor-General. It was observed that when marching past the French-Canadian Regiment all sang a well-known song, the refrain of which is "*En roulant ma boule*"—a strange but very effective custom. One of the minor features of the week was a Curling Match, which was played at the Victoria Rink in the presence of a number of spectators, and resulted in Colonel Wilson's side winning by two points. The sides were:—

Visitors.	*Quebec.*
Lord Aberdeen (skip).	Lieut.-Colonel Wilson, R.C.A. (skip).
Mr. Hope Sewell.	Mr. Brodie.
Captain Boileau, R.A.	Dr. Sewell.
Lord Ava.	Mr. Monro Fergusson, A.D.C.

This was the first Winter Carnival that has been held at Quebec, and was a very good one.

On 1st February Major Waldron started on long leave for a cruise round the West Indian Islands.

Lieut.-Colonel Anstruther joined on promotion on 21st February, and has assumed command of the R.A. Halifax District.

Lieutenant Arthy went home on 24th February on six months' sick leave, necessitated by an injury to his knee.

On 2nd March, Colonel Isaacson started in the s.s. *Duart Castle* to make an inspection of the R.A. at St. Lucia, Barbados, and Jamaica, an annual duty which has just been sanctioned and added to the office of the C.R.A. in British North America. The Colonel was not accompanied by his Staff Officer.

The winter of 1893–4 has been one of the most severe which has been experienced at Halifax for some years, and the officers have had the greatest difficulty in keeping their quarters above freezing point. Sometimes the thermometer goes down to 20°, and everything liquid in the room is frozen solid. The coldest day was 24th February, when the maximum temperature registered was zero and the minimum 12° below. A tobogganing party was given by the officers R.A. and R.E. on the Citadel Hill one night in January. Unfortunately it turned out a very cold one—5° below zero with a high wind. Nevertheless, the entertainment was largely attended, and the cold was counteracted by a huge bonfire and plenty of hot drinks—the latter disclosed a curious phenomenon, viz., hot punch in the bottom of a glass with a ring of ice at the top, caused by the steam freezing to the sides of the tumbler.

The old Curling Club in Tower Road has been revived, and all this winter the "roaring game" has been quite a rage with the officers of the R.A. and R.E., who have joined the Club in larger numbers than in any previous year. So great is the love of the game that curling is now played on the Mess billiard table every evening with pool balls, in preference to billiards or pool.

At the annual meeting of the Nova Scotia Game Society, on 1st March, Colonel Isaacson was elected Vice-President of the Society, and Major Hodgson and Captain Boileau, Members of the Council. A new Game Act was passed by the local Parliament last session containing several innovations, the most important of which are a three years' close season for cow moose, and the fixing of one date, the 15th September, for the beginning of all kinds of shooting for both large and small game.

The Adjutant R.A. British North America wishes to return thanks for the fine photograph of Lieut.-General H. Le Cocq, *late* C.R.A., British North America, sent by an unknown donor; the picture is now framed and added to the collection of portraits of ex-C.R.A. in the Colonel's office.

OBITUARY.

General Sir George Balfour, K.C.B., Colonel Commandant Royal (late Madras) Artillery, died at 6, Cleveland Gardens, Hyde Park, on the 12th inst., aged 84. Sir George Balfour joined the Madras Artillery, 16th December, 1825; became Lieutenant, 12th June, 1827; Captain, 26th March, 1844; Brevet Major, 26th March, 1844; Major, 31st December, 1857; Brevet Lieut.-Colonel, 20th June, 1854; Lieut.-Colonel, 27th August, 1858; Brevet Colonel, 9th April, 1856; Colonel, 18th February, 1861; Major-General, 5th June, 1865; Lieut.-General, 1st July, 1874; and General, 1st October, 1883. He served with the Malacca Field Force in 1832–33, in the campaign against Kurnool in 1839, including the taking of Zorapore. Served with the expeditionary force in China throughout the war of 1840–42 (medal). He was Consul at Shanghai from 1843 to the end of 1866, was a Member of the Madras Military Board from 1849 to

1857, and then Inspector-General of Ordnance. He was a Member of the Military Finance Commission in India in 1859 and 1860, and President of that Commission and Chief of the Military Finance Department from 1860 to 1862. In 1866, and from 1868 to 1870, he was on the Royal Commission on Recruiting. He was, too, Assistant to the Controller-in-Chief, War Department, from 1868 to 1871. He became C.B. in 1854 and K.C.B. in 1870.

Colonel W. T. Budgen, *D.S.O.*, whose death occurred at Mentone, on 28th February, joined the Regiment as Lieutenant, 21st June, 1856; became Captain, 6th July, 1867; Major, 8th September, 1875; Brevet Lieut.-Colonel, 8th September, 1882; and Colonel, 8th September, 1886. Colonel Budgen served during the Burmese Expedition, 1885–6–7, as C.R.A., was mentioned in despatches, *London Gazette*, 22nd June, 1886, and 2nd September, 1887 (*D.S.O.* and medal). He was Brigadier-General Commanding Bombay District from 26th January, 1889, to 25th January, 1894.

Major-General C. S. Longdon (retired), whose death occurred at Crawley, Sussex, on 2nd proximo, joined the Royal Artillery as 2nd Lieutenant, 20th December, 1839; became Lieutenant, 23rd November, 1841; Captain, 30th June, 1848; Major, 24th March, 1858; Lieut.-Colonel, 22nd June, 1860; Colonel, 22nd June, 1865; and retired on full pay with honorary rank of Major-General, 20th December, 1869.

Lieut.-Colonel W. A. Maynard (retired), died at Ratoath, County Mayo, on 9th October last. He was commissioned as Lieutenant, 8th January, 1870; became Captain, 12th May, 1880; Major, 1st September, 1885; and retired with honorary rank of Lieut.-Colonel, 1st October, 1886. Lieut.-Colonel Maynard was placed on temporary half-pay, 7th April, 1886.

Captain C. F. Lendy, died at Buluwayo, Matabeleland, on 14th January, 1894. He joined the Regiment as Lieutenant, 16th February, 1883; and became Captain, 15th March, 1892. Captain Lendy was employed with the British South Africa Company since 16th May, 1890.

Lieutenant W. M. Pinhey, who died at Bournemouth, on 2nd March, 1894, was commissioned as 2nd Lieutenant, 15th February, 1889; and became Lieutenant, 15th February, 1892. He was placed on temporary half-pay owing to ill-health on 22nd June, 1892.

DIARY OF FIXTURES.

APRIL.

Day of the Mth.	Wk.	Regimental.	Cricket, &c.	Private.
1	S	... ...	... ...	... ...
2	M	Senior Class and Firemasters' Class join Artillery College.	... ...	... ...
3	T	... ...	R.A. Races at Aldershot.	... ...
4	W	R.A. Band Concert at 9 p.m.	... ...	... ...
5	Th	... ...	... ...	... ...
6	F	... ...	R.A. *v.* R.E. Racket and Billiard Matches, at Chatham.	... ...
7	S	... ...	R.A. *v.* R.E. Racket and Billiard Matches, at Chatham.	... ...
8	S	... ...	... ...	... ...
9	M	... ...	... ...	... ...
10	T	... ...	... ...	... ...
11	W	... ...	... ...	... ...
12	Th	... ...	... ...	... ...
13	F	R.A. Band Concert at St. James's Hall.	... ...	... ...
14	S	Long Course leaves Woolwich	... ...	... ...
15	S	... ...	... ...	... ...
16	M	... ...	... ...	... ...
17	T	... ...	Epsom Spring Meeting begins	... ...
18	W	... ...	... ...	... ...
19	Th	... ...	... ...	'Ubique' Mark Lodge of Mark Master Masons meets at "Criterion."
20	F	... ...	... ...	... ...
21	S	... ...	... ...	... ...
22	S	... ...	... ...	... ...
23	M	... ...	... ...	... ...
24	T	... ...	Newmarket Craven Meeting begins.	... ...
25	W	... ...	... ...	... ...
26	Th	... ...	... ...	... ...
27	F	R.A. Band Concert at St. James's Hall.	... ...	... ...
28	S	1st Div. arrives at Lydd.	... ...	... ...
29	S	... ...	... ...	... ...
30	M	... ...	... ...	... ...

MAY.

1	T	... ...	... ...	... ...
2	W	... ...	R.A. Woolwich *v.* R.N. College, at Greenwich.	... ...
3	Th	... ...	... ...	... ...
4	F	... ...	... ...	... ...
5	S	1st Div. F.A. (Aldershot) reaches Shoeburyness.	R.A. Woolwich *v.* R.A. Shoebury, at Shoebury.	... ...
6	S	... ...	... ...	... ...
7	M	Position-Finding Class joins Artillery College.	... ...	... ...
8	T	... ...	Newmarket 1st Spring Meeting begins.	... ...
9	W	... ...	... ...	... ...
10	Th	... ...	... ...	... ...
11	F	... ...	... ...	... ...
12	S	2nd Div. F.A. (Aldershot) reaches Shoeburyness, and 1st Div. R.H.A. (Aldershot) reaches Okehampton.	R.A. Woolwich Officers *v.* N.C. Officers.	... ...
13	S	Whit Sunday.	... ...	... ...
14	M	Bank Holiday.	... ...	'Ubique' Lodge Meeting of "Criterion," installation at W.M.
15	T	... ...	... ...	... ...
16	W	... ...	... ...	... ...

MAY.—*Continued.*

Day of the Mth	Wk.	Regimental.	Cricket, &c.	Private.
17	Th	... ...	... ...	... ...
18	F	... ...	... ...	... ...
19	S	3rd Div. F.A. (Weedon) reaches Shoeburyness. 1st Course of Field Gunnery begins at Okehampton.	R.A. Woolwich *v.* R.M.C., at Sandhurst.	... ...
20	S	... ...	... ...	... ...
21	M	... ...	... ...	... ...
22	T	... ...	Newmarket 2nd Spring Meeting begins.	... ...
23	W	... ...	... ...	... ...
24	Th	... ...	... ...	... ...
25	F	... ...	R.A. *v.* Aldershot Division, at Aldershot.	... ...
26	S	4th Div. F.A. (Ipswich) reaches Shoeburyness. 1st Div. R.H.A. begins at Glenbeigh.	R.A. *v.* Aldershot Division, at Aldershot.	... ...
27	S	... ...	... ...	... ...
28	M	... ...	... ...	... ...
29	T	... ...	... ...	... ...
30	W	... ...	... ...	... ...
31	Th	... ...	... ...	... ...

JUNE.

1	F	... ...	R.A. *v.* Greenjackets, at Winchester.	... ...
2	S	5th Div. F.A. (Colchester) reaches Shoeburyness.	R.A. *v.* Greenjackets, at Winchester.	... ...
3	S	... ...	... ...	... ...
4	M	... ...	... ...	... ...
5	T	... ...	Epsom Races begin.	... ...
6	W	2nd Div. F.A. (Sheffield) reaches Okehampton.	The Derby.	... ...
7	Th	... ...	... ...	... ...
8	F	... ...	The Oaks.	... ...
9	S	2nd Div. F.A. begins at Glenbeigh.	R.A. Woolwich *v.* R.A. Shoebury, at Woolwich.	... ...
10	S	... ...	... ...	... ...
11	M	... ...	... ...	... ...
12	T	... ...	... ...	... ...
13	W	... ...	R.A. *v.* Household Brigade, at Chelsea.	... ...
14	Th	... ...	R.A. *v.* Household Brigade, at Chelsea.	... ...
15	F	R.A.I. Annual General Meeting at R.U.S.I.	REGIMENTAL DINNER.	
16	S	Long Course goes to Lydd.	R.A. Woolwich *v.* Blackheath, at Woolwich.	... ...
17	S	... ...	... ...	... ...
18	M	... ...	R.A. *v.* M.C.C., at Lords.	... ...
19	T	... ...	R.A. *v.* M.C.C., at Lords. Ascot begins.	... ...
20	W	... ...	... ...	... ...
21	Th	... ...	... ...	'Ubique' Royal Arch Chapter meets at "Criterion," installation of Principals.
22	F	3rd Div. F.A. begins at Glenbeigh.	R.A. *v.* B.B., at Woolwich.	... ...
23	S	6th Div. F.A. (Woolwich) reaches Shoeburyness.	R.A. *v.* B.B., at Woolwich.	... ...
24	S	... ...	... ...	... ...
25	M	... ...	... ...	... ...
26	T	... ...	... ...	... ...
27	W	... ...	R.A. *v.* Yorkshire Gentlemen, at Woolwich.	... ...
28	Th	... ...	R.A. *v.* Yorkshire Gentlemen, at Woolwich.	... ...
29	F	... ...	... ...	... ...
30	S	2nd Div. arrives at Lydd. Long Course leaves Lydd.	... ...	... ...

JULY.

Day of the Mth	Wk.	Regimental.	Cricket, &c.	Private.
1	S	... ...	... ...	... ...
2	M	3rd Div. F.A. (Hilsea) reaches Okehampton.	Oxford *v.* Cambridge.	... ...
3	T	... ...	Oxford *v.* Cambridge.	... ...
4	W	... ...	Oxford *v.* Cambridge. Newmarket 1st July Meeting begins.	... ...
5	Th	4th Div. F.A. begins at Glenbeigh.	... ...	... ...
6	F	... ...	R.A. *v.* Oxford Authentics, at Woolwich.	... ...
7	S	2nd Course of Field Gunnery begins at Okehampton.	R.A. *v.* Oxford Authentics, at Woolwich.	... ...
8	S	... ...	... ...	... ...
9	M	... ...	R.A. *v.* Harlequins, at Woolwich.	... ...
10	T	... ...	R.A. *v.* Harlequins, at Woolwich.	... ...
11	W	... ...	... ...	... ...
12	Th	... ...	... ...	... ...
13	F	... ...	R.A. *v.* R.E., at Chatham. Eton *v.* Harrow.	... ...
14	S	... ...	R.A. *v.* R.E., at Chatham. Eton *v.* Harrow.	... ...
15	S	... ...	... ...	... ...
16	M	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich.	... ...
17	T	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich. Newmarket 2nd July Meeting begins.	... ...
18	W	... ...	R.A. Woolwich *v.* Charlton Park, at Woolwich.	... ...
19	Th	... ...	... ...	'Ubique' Mark Lodge of Mark Master Masons meets at "Criterion," installation of W.M.
20	F	... ...	... ...	... ...
21	S	... ...	R.A. Woolwich *v.* Blackheath, at Blackheath.	... ...
22	S	... ...	... ...	... ...
23	M	... ...	... ...	... ...
24	T	... ...	Old Shoebury Match.	... ...
25	W	... ...	Old Shoebury Match.	... ...
26	Th	... ...	... ...	... ...
27	F	4th Div. R.H.A. (Woolwich) reaches Okehampton.	R.A. *v.* Free Foresters, at Woolwich.	... ...
28	S	... ...	R.A. *v.* Free Foresters, at Woolwich.	... ...
29	S	... ...	... ...	... ...
30	M	... ...	R.A. *v.* Mote Park, at Maidstone.	... ...
31	T	... ...	R.A. *v.* Mote Park, at Maidstone. Goodwood begins.	... ...

PRÉCIS

AND

TRANSLATION.

"REVUE MILITAIRE DE L'ETRANGER."

THE NEW FIRING MANUAL OF THE GERMAN FIELD ARTILLERY.

PRÉCIS BY

LIEUT.-COLONEL J. H. G. BROWNE, LATE R.A.

THE adoption in June, 1892, of a new book of Regulations for the manœuvres of German Field Artillery led to the expectation of the speedy appearance of a new firing manual. The *Schiessvorschrift für die feld Artillerie* dates back to May, 1890. Since then a number of changes have taken place in the *matériel* of German Field Artillery. The common shell with its percussion fuze has disappeared; a new shrapnel has been adopted, and the batteries have been provided with a special arrangement for indirect fire, the *Richtfläche*. A revision of the *Schiessvorschrift* had therefore become a necessity.

A new firing manual was issued on 22nd May, 1893, and placed provisionally in the hands of the troops, who were to conform to its directions during 1893 and 1894. It is to be reported on to the Minister of War before the 1st December, 1894, so that the revised text will not appear for sometime and its present form may be materially altered. It is however interesting as indicating the present tendencies of the German Artillery, and the direction in which they are seeking to improve their firing regulations.

The first part, namely that which relates to the principles and methods of regulating fire, is the only one which is materially altered. As has been just said, the common shell has been suppressed. This projectile, which had a percussion fuze only, was principally used for finding the range and elevation; strictly speaking it was not a fighting projectile. Its only advantage was that the smoke emitted when bursting rendered the point of impact easily visible. Its abolition indicates that the Germans are now in possession of a field shrapnel, whose bursting point can be easily observed, even when firing with percussion fuzes.

This projectile which is called the "Shrapnel pattern 1891," gives on bursting the same number of bullets and splinters as the shrapnel of 1882 (about 300); it is provided with a double-action fuze; its cone of dispersion is somewhat narrower than that of the old shrapnel, viz.: from 21° to 22° instead of 25°. It

would generally be employed with a time fuze bursting 50 to 120 metres short of the target. With short ranges of under 1500 metres the bursting point might even be as much as 200 metres short of the target. When used with a percussion fuze the effects of this shrapnel are like those of the old common shell; depending much upon the nature of the ground, and diminishing rapidly with the increase of the range. Against targets placed immediately behind a covering mass the "obus-torpille" must be used. This shell also has a double-action fuze, and a cone of dispersion of about 110°. At a range of 1500 metres the bullets in the lower part of this cone would strike the ground at an angle of about 64°, instead of 20°, as in the case of the shrapnel. The "obus-torpille" with a percussion fuze is used to destroy houses and other obstacles which may be met with in the field, but is very rarely employed against troops, excepting at ranges of over 3500 metres, where the use of the time fuze is impossible for shrapnel.

After these remarks on the effects of projectiles, the manual devotes the whole of an entirely new chapter to the reconnaissance of the target by the Battery Commander. The importance of such reconnaissance had already been shown during peace manœuvres, and regulations had been made with regard to it. "Every artillery position should be reconnoitred with reference to the target aimed at and to the troops placed in front."

To avoid attracting the enemy's attention this reconnaissance should, if necessary, be made on foot, the escort, which should be as small as possible, being left in rear. To be complete the reconnaissance should deal with the following points: the position of the target, its nature and extent, and an estimate of the range made from the map and from results obtained by firing at other targets. This estimate should be made with great care when the battery has to fire over the heads of other troops. The nature and position of any covering mass should also be ascertained, and the zones of ground which ought to be cannonaded determined upon. Some attempt should also be made to estimate the nature of the soil in the neighbourhood of the target. Lastly, the Battery Commander must select the part of the target on which to lay the guns to determine the range and elevation, and must take every precaution to prevent confusion among the "pointeurs."

The targets met with in the field are divided into two classes (1) fixed; (2) moveable; and these again may be sub-divided into several others. We will very briefly review the methods employed in these different cases in order to determine the range.

The simplest case is that of fire with a percussion fuze against a fixed, visible target at a range of over 1500 metres. In this case the method of finding the range is not altered, combining three distinct operations:—(1) Determination within the wide limit of 200 metres;[1] (2) within the narrower limit of 50 metres; (3) with exactness, that is to say, with a proportion of two to four short shots out of every six.

When firing with the "obus-torpille" at long ranges the range cannot, according to the new *Schiessvorschrift*, be determined with exactness, but can only be approximated to.

The method of finding the range when firing against a fixed target has not been materially altered. The wide limit of 100 metres is first determined with percussion fuzes, but not the narrow one of 50 metres. Time fuzes are then used with the lower elevation corresponding to this limit, and six shots are always fired in each round. The range is considered sufficiently determined when not more than two shots out of six are long, whether firing with percussion or time fuzes.

If the range is under 1500 metres the methods of finding it are naturally simplified, with the view of producing an immediate effect upon the object aimed

[1] A German metre = 39 inches very nearly.—*J.H.G.B.*

at. When firing with percussion fuzes a limit of 100 metres will be first determined. The lower elevation thus found will then be taken, and the tangent scale gradually raised until the shots fall both long and short.

When using time fuzes the range should also be rapidly determined. A limit of 200 metres only should be found with percussion fuzes, and time fuzes should then be resorted to, beginning with the lower elevation of the above limit. For carrying out this time-fuze firing, the manual indicates that a new sighting arrangement, called the "Visirklappe," will be brought into use, but, as it is not yet in the service, it cannot be accurately described.

A protest against this rapid method of opening fire has, however, been made by Colonel Rohne, of the German Artillery, who considers that accuracy is being sacrificed; but, despite his high authority, his ideas do not appear to be favoured by the German authorities.

Fire with the "obus-torpille" receives a longer notice. This projectile is specially intended for firing against objects placed immediately behind a covering mass. It is, properly speaking, a shrapnel with a very wide cone of dispersion, and a relatively feeble bursting charge. In introducing this projectile into the service, the Germans have evidently wished to obtain the advantages of curved fire without being obliged to adopt a special piece for the purpose. The partisans of curved fire are very numerous in Germany, the best known among them being the Bavarian General, von Sauer, whose ideas have already been noticed in the "Proceedings." The German Artillery seem so far to agree with the General that they recognise the necessity of being able to strike troops behind shelter, but they have tried to obtain the high angles of incidence, which are required, through the medium of the projectile itself, and not through that of a special piece of ordnance. But it is easy to show that a shrapnel, with a wide cone of dispersion, can only imperfectly replace a piece specially constructed for curved fire, because the effect produced upon troops behind cover will depend, not only upon the accuracy with which the gun is laid, but also upon the regularity of the combustion of the fuze. If the latter is irregular there will, with a low trajectory, be little chance of striking the object aimed at, even if the piece is laid correctly. On the other hand, if a shrapnel with a narrow cone of dispersion be fired from a gun intended for curved fire, any irregularity in the burning of the fuze will have much less effect because, from the steepness of the trajectory, there will be a wide margin within which the shell may burst without failing to strike the required target.

Colonel Rohne has written a pamphlet in which he criticises the method of regulating the fire of the "obus-torpille," and has published tables to show that the effect on the target would not be satisfactory. He proposes another method of his own, which seems to have attracted some attention.

With regard to indirect fire the new manual does not enter into the circumstances under which it would be used, because that question belongs to the domain of tactics. But in default of official documents, the military press indicates the ideas of the German Artillery on the subject. A recent article in the *Militär Wochenblatt* sets forth all the advantages which the German Artillery expect to gain over their enemy in the next campaign, by the judicious use of indirect fire:—"'The Artillery Regulations' (1892) lay down that the employment of indirect fire should be restricted to cases where the nature of the combat and the formation of the ground prohibit the employment of direct fire. But what are these cases? Here the Regulations are silent, and all sorts of opinions may prevail. The partisans of indirect fire look upon it as a new means of action, which ought to be thoroughly studied; its opponents regard it as a sort of game of 'hide-and-seek,' which should be rejected entirely."

"The opponents, for example, maintain that the artillery, by defilading itself

from view, will bring all the weight of the combat upon the other arms, who will thus be sacrificed. This objection is an invalid one, because in large masses of artillery, the only case which need be considered, as their employment is ordered officially, there will be no idea of defilading all the batteries. Some of them will be masked, but the others will be always more or less in the open. It would be a mistake to try and carry on indirect fire with the whole mass of guns at the same time, because the execution of such fire presents great difficulties; but some of the batteries of the mass may well be employed in this kind of fire; and it may be easily understood that under these circumstances artillery may in the future utilise certain positions which would have been unsuitable otherwise, on account of the amount of cover afforded."

"When several batteries have simultaneously to find the range of a target of limited dimensions, the fire of each battery must be concentrated upon an entirely distinct point, and all these points must be far enough apart to enable each Battery Commander to distinguish the fall of his own projectiles from those of the neighbouring batteries. If an auxiliary target is used, as must be the case for indirect fire, the direction must of necessity be corrected by the observation of the first shots. The errors of the first shots will be more considerable than when the laying is direct, and the fall of the projectiles may be confused with that of the neighbouring batteries, thus causing great complications."

"Another reason which tends to limit the employment of a defiladed position by a mass of artillery, is that it is necessary that the batteries should be in a position to defend themselves, and with that view, to sweep the ground in front of them at short ranges. A gun defiladed behind a crest can see nothing of it, and this situation would become very dangerous at the critical moment."

"The employment of indirect fire in a mass of artillery will therefore be limited to certain batteries, as is indicated by the Regulations of June, 1892. The other batteries, partly defiladed, will find the range more rapidly, will draw the enemy's fire upon themselves, and will probably sustain greater losses; but the defiladed batteries will produce more serious effects, because they will be able to fire more calmly, and will be less exposed to being demoralised by the enemy's fire."

Such are the arguments put forward by the *Militär Wochenblatt* to justify the employment of indirect fire in the field. They are in accordance with the tendency already noticed in the German Artillery to introduce the practice of indirect fire definitely and soon into their proceedings.

NOTES

FROM

CORRESPONDING MEMBERS.

The Annual General Meeting of the R.A. Institution will take place at 3 p.m. on Friday the 15th June in the Lecture Theatre of the Royal United Service Institution, Whitehall.

The Committee intend to propose the following alteration in the Rules:—

Para. 3 of Rule II. on page 2 to read—"The Committee shall have power to elect as honorary Members such gentlemen connected with Naval and Military arts and sciences as they from time to time think fit; and for short periods, officers of the Army and Navy who may be temporarily in the garrison or neighbourhood," instead of as it now stands.

After the business of the Institution is finished the R.A. Charities, R.A. Games' Fund, and R.A. Cricket Club will be considered.

Anyone wishing to raise a question or to propose a change in any of them is requested to communicate with the Hon. Secretary of the Fund concerned at Woolwich.

At the consideration of the R.A. Games' Fund mentioned above the Committee intend to ask the Meeting to approve the following:—

"That Inter-Regimental R.A. and R.E. Golf Matches be instituted to be played either once or twice a year and under such conditions as the Games' Fund Committees of the Regiment and Corps shall settle."

"That the R.A. Games' Fund give a sum, not exceeding £30, to be added to a similar sum given by the R.E. Games' Fund for the purchase of a Challenge Cup to be held by the winner of such periodical golf matches under conditions similar to those governing the Racket and Billiard Matches."

The Committee will be glad to receive, as soon as possible, suggested subjects on Garrison Artillery for the "Duncan" Gold Medal Prize Essay, 1895.

Readers of the R.A.I. "Proceedings" may remember a paper that appeared in the Notes of No. 3, Vol. XIX., January, 1892, describing a visit to a civilian collector of military works of art, books, and curios. The gentleman there referred to is now leaving the neighbourhood of London to live in the country, and is obliged to dispose of his collection.

Anyone possessing the means and fond of military curios and histories has now a chance of acquiring a nearly unique collection. The Secretary R.A. Institution will be happy to answer any inquiries on the subject.

THE paper by Captain A. C. T. Boileau, R.A., on the "United States Military Academy at West Point," published in No. 12, Vol. XIX., of "Proceedings," attracted much appreciative interest in America and Canada. Among others 1st Lieut. E. W. Hubbard, 3rd Artillery, U.S.A., writes to point out a few minor errors of detail that a stranger must find it hard to avoid.

He shows how the Ordnance differs from the Artillery; of what the garrison of West Point consists; who the "Commandant of Cadets" may be; and how the professorships are the only permanent posts of the Military Academy. He concludes a very kind letter to the author, with remarks on points connected with the cadets' games, messing, and dress.

THE following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893:—

Captains (*c*) and (*d*) ... price 1s. 1d.
Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

DURING the past month the 2nd Volume (1685—1689) of English Army Lists and Commission Registers, edited by C. Dalton, F.R.G.S., has appeared. The Introduction of 24 pages describes most clearly how James II. formed his army, while the author's annotations briefly refer to any point of interest in the history of the man whose name is recorded. The work is most complete, and it is to be hoped that the Author will again receive sufficient encouragement to lead him to publish another volume.

R.A.I "DUNCAN" PRIZE ESSAY, 1894.

THE Secretary has received in addition to those mentioned in April "Proceedings," Essays bearing the mottoes:—

"Si vis pacem para bellum."
"Rapidité! Promptitude! Audace!"
"Vigilentia non cadit."
"Rules were made for fools
Wise men know when to break them."
"Union is strength."

This Institution has been honoured by receiving authors' copies of "The Outlines of Quarternions," by Lieut.-Colonel H. W. L. Hime (late) Royal Artillery, and formerly Secretary R.A.I., and of "Hydrostatics," by Professor A. G. Greenhill, F.R.S., a Special Honorary Member of the R.A.I. We hope to notice these valuable works at greater length in an early number of the "Proceedings."

ROYAL ARTILLERY DINNER CLUB.

Rules.

Officers of the Royal Artillery on full or half-pay, can become annual subscribers at the rate of five shillings per annum, under the following conditions:—

(*a*) On joining the Regiment.
(*b*) If a Subaltern, by payment of five shillings for every year of service up to five years, which shall be the maximum number of years subscription chargeable to officers of that rank on joining.
(*c*) If a Captain, by payment of six years subscriptions.
(*d*) If a Major, by payment of seven years subscriptions.
(*e*) If a Lieut.-Colonel, by payment of eight years subscriptions.

THE

ROYAL ARTILLERY ANNUAL DINNER

WILL TAKE PLACE AT

QUARTER BEFORE EIGHT O'CLOCK,

On FRIDAY, 15th JUNE, 1894,

AT

THE HOTEL MÉTROPOLE

(Private Entrance in Whitehall Place),

HIS ROYAL HIGHNESS THE COLONEL OF THE REGIMENT

IN THE CHAIR.

Prices as follows:—	£	s.	d.
Subscribers	0	16	0
Non-Subscribers	1	15	0

Dinner Tickets will not be supplied, but officers are requested to give their visiting cards at the entrance, on the evening of the dinner, to the official appointed to receive them.

It is particularly requested that officers intending to dine will furnish *early* intimation to the Honorary Secretary; and, to avoid inconvenience, it is desirable that the same should be accompanied by *cheque*, for the amount of subscription to the dinner, *except from officers who bank with Messrs. Cox & Co.*, who are

informed that the amount due from them for the dinner will be charged to their accounts.

Names of officers who notify their intention of being present at the dinner cannot be removed from the list after the 12th June, and officers who omit to notify before that date will be charged an extra sum of 5s.

Advertisements will duly appear in the *Times*, *Morning Post*, and *Army and Navy Gazette*.

All communications to be addressed to

LIEUTENANT-COLONEL R. A. MONTGOMERY,
Hon. Secretary R.A. Dinner Club,
HORSE GUARDS,
WAR OFFICE, PALL MALL.

Should an officer wishing to dine have been unable to give notice before 12th June, he should inform the Secretary at the War Office direct, and not apply to the Hotel officials.

A REGIMENTAL POINT-TO-POINT RACE.

A SUGGESTION has been made that a Regimental Point-to-Point Race should be instituted and take place for the first time next spring; all who approve of the idea are requested to communicate with the Secretary R.A.I., Woolwich, if possible before the 20th May, making any suggestions for the rules and conditions under which the race should be run.

ALDERSHOT.

ROYAL ARTILLERY RACES.

Clerk of the Course and Stakeholder: Lieut.-Colonel S. H. Toogood. Clerk of the Scales, Judge, and Handicapper: Mr. R. I'Anson. Starter: Major F. W. J. Eustace, R.H.A.

TUESDAY, APRIL 3RD.

For the fourth year in succession the Regimental Races have been favoured with lovely weather. As the business arrangements were excellent, the lunch and refreshments better than usual and the attendance best ever known, the meeting was certainly the most successful held for many years. The Gold Cup once more went to Aldershot; of the other races Woolwich took two and Coventry one. Besides the Regimental Races there were three open races, which brought out fields of nine, three, and four.

THE ROYAL ARTILLERY WELTER STEEPLECHASE of 50 sovs., with 10 sovs. to the second, and 5 sovs. to the third; 13 st. 7 lb. each. Two miles and a half.

Capt. R. L. Heygate's gr g SEAGULL, aged	OWNER	1
Capt. J. D. Barry's PRINCE ARTHUR, aged	OWNER	2
Mr. H. L. Powell's IVOR, aged	CAPT. A. KING	3
Mr. E. H. Pim's SIMS REEVES, aged	Mr. G. Gillson	0
Mr. F. E. H. Allen's BONAVENTURE, aged	Owner	0
Mr. J. F. N. Birch's THE PRIEST, aged	Owner	0

Betting : 2 to 1 against Prince Arthur, 3 to 1 against Seagull, 6 to 1 each against Ivor and Bonaventure, and 10 to 1 against any other. Bonaventure made running from Seagull and The Priest, with Sims Reeves last. After going a mile Bonaventure fell, The Priest and Sims Reeves also coming down. Seagull then drew away, and won easily by half-a-dozen lengths ; a bad third.

THE ROYAL ARTILLERY GOLD CUP, value 100 sovs., with 50 sovs. to the winner, 20 sovs. to the second, and 10 sovs. to the third; 12 st. ; winners extra. Three miles.

Capt. H. A. Chapman's ch g FATHER PAT, aged, 12 st. MR. W. F. O'CONNOR 1
Mr. W. A. Boulnois's ENNISCORTHY, aged, 12 st. MR. C. O. HEAD 2
Mr. M. S. Williams's ELEVATOR, aged, 12 st. 7 lb. CAPT. J. HANWELL 3
Capt. J. W. G. Dawkins's PILGRIM, aged, 13 st. ..... Owner 0
Mr. E. H. Pim's TRYM, aged, 12 st. 7 lb. ..... Mr. M. Peake 0
Mr. M. S. Williams's WYOMING, aged, 12 st. ..... Mr. G. Gillson 0
Mr. E. P. England's BRIGHT EYES, aged, 12 st. ..... Owner 0
Major A. H. Carter's SPITFIRE, aged, 12 st. ..... Owner 0
Mr. E. J. R. Peel's COMEDY, aged, 12 st. ..... Owner 0
Mr. H. L. Powell's OLD GEORGE, aged, 12 st. ..... Capt. A. King 0
Capt. R. L. Heygate's FLASHLIGHT, 5 years, 12 st. ..... Owner 0

Betting : 4 to 1 each against Enniscorthy, Elevator, and Flashlight, 6 to 1 each against Pilgrim, Father Pat, and Spitfire, 7 to 1 against Old George, and 100 to 8 against any other (offered). Flashlight at once went to the front and cut out the work with a long lead of Enniscorthy, Spitfire, and Old George for two miles. Comedy having refused three-quarters of a mile from home, Flashlight fell, and Enniscorthy drew away, followed by Father Pat, Elevator, and Spitfire. Coming into the straight, Father Fat sailed right away and won by 20 lengths ; a bad third. Spitfire falling at the last fence left only the placed horses to finish.

THE ROYAL ARTILLERY LIGHT WEIGHT STEEPLE-CHASE of 50 sovs., with 10 sovs. to the second, and 5 sovs. to the third; 11 st. 7 lb. each. Two miles and a half.

Mr. H. de Prée's OYSTER, 6 years ..... MR. E. J. R. PEEL 1
Capt. R. L. Heygate's WANDERER, 5 years ..... OWNER 2
Mr. F. E. H. Allen's BONAVENTURE, aged ..... OWNER 3
Capt. H. A. Chapman's KATHLEEN, aged ..... Mr. W. F. O'Connor 0
Capt. H. A. Chapman's BEESWING, aged ..... Capt. A. King 0
Mr. R. St. C. Harman's NELLIE, aged ..... Mr. C. O. Head 0
Capt. C. G. Mackenzie's VERA, aged ..... Owner 0
Mr. K. J. Kincaid-Smith's EXCHANGE, 6 years ..... Owner 0
Mr. G. F. Dixon's HEREWARD (h-b), 6 years ..... Mr. M. Peake 0

Betting : 5 to 2 against Wanderer, 4 to 1 against Beeswing, 5 to 1 each against Kathleen and Vera, and 10 to 1 against any other. Bonaventure made play, followed by Oyster, Wanderer, and Bright Eyes, with Nellie last, until half the distance had been covered, when Wanderer drew to the front. Half-a-mile further on the leader was joined by Oyster, the pair drawing clean away from the others, of whom Bonaventure was third and Kathleen next. As they entered the straight Oyster went in front and won easily by two lengths ; a bad third. Kathleen was fourth, Vera fifth, Exchange next, and Nellie last.

THE ROYAL ARTILLERY CONSOLATION HURDLE RACE of 25 sovs. for beaten horses in the regimental races ; the second

to receive 4 sovs. out of the race; 12 st. each. Two miles, over eight hurdles.

Mr. M. S. Williams's WYOMING .....Mr. G. GILLSON 1
Mr. E. J. R. Peel's COMEDY .....OWNER 2
Mr. J. F. N. Birch's THE PRIEST .....MR. C. O. HEAD 3

Betting : 5 to 4 on Wyoming, 5 to 2 against The Priest, and 3 to 1 against Comedy. Wyoming waited on The Priest until a quarter of a mile from home, and won by 20 lengths; a bad third.

ROYAL ARTILLERY ALDERSHOT POINT-TO-POINT RACES.

These races took place at Odiham, Hants, on Saturday, 7th April. The course, which was about three miles, and included 35 jumps, was marked out by Lieut.-Colonel E. Blaksley, Lieut. R. C. Livingstone-Learmonth, and Lieut. W. Strong. The placed horses were as follows :—

LIGHT WEIGHTS.

Capt. H. A. Chapman's KATHLEEN .....OWNER 1
Capt. C. G. Mackenzie's LORD MAYOR .....OWNER 2
Capt. H. A. Chapman's FATHER PAT .....CAPT. A. KING 3

Won by a length.

HEAVY WEIGHTS.

Mr. C. Prescott-Decie's SUNBEAM .....OWNER 1
Mr. C. Behrens's THOR .....OWNER 2
Mr. H. L. Powell's IVOR.....OWNER 3

Won by four lengths.

WOOLWICH.

THE ROYAL ARTILLERY DRAG HUNT POINT-TO-POINT RACES.

Committee : Colonel W. S. Curzon, Major J. W. Dunlop, Captain R. L. Heygate, Major F. A. Yorke, M.D.H., Captain W. Paget, and Mr. J. F. N. Birch, A.D.C. Hon. Sec. : Mr. G. Gillson.

These races took place over the old course, starting from below Severndroog Castle, thence to Lowe's Meadows, past Well Hall and the back of Eltham Gas Works, round a flag on the old regimental racecourse ground, back under the new railway line, through Manor Farm, finishing in the meadow below the Cemetery Hill. Although the ground was very hard and there were one or two falls, happily no one was hurt. The attendance was the largest known, and the weather glorious.

WEDNESDAY, APRIL 11TH.

THE GARRISON CHALLENGE CUP, presented by Major-General A. H. Williams, for *bonâ fide* maiden hunters that have regularly hunted with the R.A. Draghounds during the past season; catch weights; over 12 st. 7 lb.

Capt. R. L. Heygate's WANDERER.....OWNER 1
Mr. R. St. C. Harman's NELLIE.....OWNER 2
Mr. E. S. E. W. Russell's PERIGORD.....OWNER 3
Capt. E. J. Phipps-Hornby's PROTEST .....Owner 0
Mr. G. T. Forestier-Walker's MR. JONES.....Owner 0
Mr. S. F. Metcalfe's CIGARETTE ... .Owner 0
Mr. A. M. de L. Cowper-Smith's LASS.....Owner 0

Mr. Jones led the field for nearly a mile, when the running was taken up by Wanderer, who obtained a very long lead, but Nellie made up a lot of ground towards the finish, and was only beaten a length, Perigord just beating Protest for third place.

HEAVY WEIGHT RACE, for horses the property of members, and regularly hunted with the R.A. Drag; catch weights; over 14 st.

Mr. F. A. G. Y. Elton's PAUL	Owner	1
Mr. G. T. Forestier-Walker's PILOT	Owner	2
Mr. A. M. de L. Cowper-Smith's PARKER	Owner	3
Mr. J. F. N. Birch's THE PRIEST	Owner	0
Mr. E. H. Pim's SIMS REEVES	Owner	0
Capt. R. L. Heygate's WILLOUGHBY	Owner	0
Mr. F. W. Heath's CONAMUR	Owner	0
Major F. T. M. Beaver's LION	Mr. G. Gillson	0

Mr. Elton's and Mr. Forestier-Walker's mounts soon drew clear of the others, Paul winning by three lengths from Pilot; 10 lengths separating the last-named from Parker, who was just in front of Conamur, fourth.

LIGHT WEIGHT RACE, for horses the property of members, and regularly hunted with the R.A. Drag; catch weights; over 12 st.

Capt. H. M. Ferrar's SURPRISE	Owner	1
Mr. H. J. H. Winwood's EMUS	Owner	2
Mr. E. H. Pim's TRYM	Mr. C. O. Head	3
Mr. E. S. E. W. Russell's BELLE	Owner	0
Capt. E. J. Phipps-Hornby's L'ENFANT PRODIGUE	Owner	0
Capt. P. B. Taylor's CHANCE	Owner	0

Each in turn led for half the distance, when a good race home ended in favour of Surprise, who won by a couple of lengths; bad third.

QUETTA.

THE following short notes of "light" mahseer fishing obtainable in the neighbourhood of Quetta, Baluchistan, may prove of use to officers that are ever quartered there. Train to Baber Kach, 133 miles, where there is an old railway bungalow, permission to occupy which can be obtained from the Chief Engineer of the line at Sharigh: it is better, however, to take a small tent, as the house is very dirty and infested by mosquitos, &c. The river is about half a mile below the railway station; fish from its junction with the Béji River down to the station of Nari, 15 miles, moving camp as necessary. Tanduri Station is a good central position. The best bait appears to be small rohu or mahseer, which, however, are difficult to obtain, if very small hooks are taken the station-master's son at Baber Kach can catch them, three to four inches long are best, and the Archer spinner is a very good attachment, 14 feet double-handed trout rod, 60 yards line, and two yard single salmon gut casts, with at least three swivels. Two sets of Williams' (10, Great Queen Street, London) detachable leads are useful when fishing heavy water. I was informed that spoons were very little good, but one day running out of small fish used a spoon known in India as Scott's No. 2 with good results. A few of these should certainly be taken for, as before remarked, the small bait are with difficulty procured and rapidly go bad. (Note from North Punjab Fishing Club Angler's Hand-book, 1890. Newman & Co., 4, Dalhousie Square, Calcutta). "It may often be required to preserve dead baits or take them to a place where they are not obtainable. Immerse in methy-

lated spirit, or in acetic acid mixed with water (proportion one-third acid to two-thirds water), pack the baits in a tin box, like sardines, with plenty of salt, they should be wiped dry first, a small slit in the belly to allow the salt to enter the body will do no harm." All supplies should be taken, though milk and an occasional fowl may be obtainable. The Béji River seems to give the best fishing, the best way to get at it is to march from Baber Kach to near the village of Kot Mandi, about eight miles, here the Béji enters rough ground, which continues till its junction with the Nari below Baber Kach. The station-master can usually procure a camel for baggage. From April to end of May appears the best time, but from the middle of September to end of October is good. It must be impressed that every precaution must be taken against fever, as the sun is very hot and constant wading is necessary. I should not recommend anyone at all subject to malaria to make the attempt in May or September. A gun should be taken, as "*sesee*" are numerous, and occasional duck and teal are met with. I do not think there are many fish above 10 lbs. to be taken, though I believe there are larger ones near Nari. I would recommend anyone desiring to fish in India to obtain the "Angler's Hand-book," by Captain Lacy, 45th Sikhs, already mentioned, as information on every subject is given in a simple and interesting manner. From 13th to 20th October, 1893, Major Mansel, R.A., and two friends caught 58 fish, weighing 157¼ lbs., of these one weighed 10, one 9¼, one 8½, and one 8 lbs., the average being about 3 lbs.

INTER-REGIMENTAL

RACKET AND BILLIARD MATCHES.

R.A. *v.* R.E.

Played at Chatham, April 6th and 7th, 1894.

DOUBLE RACKETS.

PLAYED AT 3 P.M., 6TH.

R.A.		R.E.
CAPTAIN A. M'N. COOPER-KEY. / CAPTAIN C. D. KING.	*v.*	CAPTAIN J. HAMILTON. / LIEUT. E. M. BLAIR.

1st Game.	*2nd Game.*	*3rd Game.*	*4th Game.*	*5th Game.*
R.A. 5.	R.A. 3.	R.A. 17. } set 3.	R.A. 15.	R.A. 10.
R.E. 15.	R.E. 15.	R.E. 18. }	R.E. 3.	R.E. 15.

SINGLE RACKETS.

PLAYED AT 10.30 A.M., 7TH.

R.A.		R.E.
LIEUT. F. W. QUINTON.	*v.*	LIEUT. E. M. BLAIR.

1st Game.	*2nd Game.*	*3rd Game.*
R.A. 11.	R.A. 12.	R.A. 5.
R.E. 15.	R.E. 15.	R.E. 15.

CAPTAIN A. M'N. COOPER-KEY. *v.* CAPTAIN J. HAMILTON.

1st Game.	*2nd Game.*	*3rd Game.*	*4th Game.*
R.A. 15.	R.A. 11.	R.A. 16. } set 3.	R.A. 15.
R.E. 8.	R.E. 15.	R.E. 13. }	R.E. 6.

The R.E. won the odd event, and keep the Cup through the ensuing year.

BILLIARDS.

R.A.		R.E.

1ST MATCH.—PLAYED AT 5 P.M.

CAPTAIN E. M. LACHLAN	beat	MAJOR R. M. RUCK.
300.		134.
Best breaks 29, 26, 24, 18, 18, 13, 13, 11, 11.		Best breaks 19, 11, 11.

2ND MATCH.—PLAYED AT 10 P.M.

CAPTAIN F. VANS-AGNEW.	lost to	MAJOR A. R. E. DORWARD, D.S.O.
255.		300.
Best breaks 26, 23, 22, 16, 15, 15, 11, 11, 10.		Best breaks 33, 26, 17, 16, 14, 13, 12, unfinished, 11, 11, 11, 10.

3RD MATCH.—PLAYED AT 11.15 P.M.

MAJOR F. A. CURTEIS.	lost to	LIEUT. H. B. JONES.
285.		300.
Best breaks 30, 17, 17, 16, 16, 15, 14, 13, 13, 12.		Best breaks 26, 22, 20, 17, 15, 14, 12, 12.

The R.E. won the odd event, and keep the Cup through the ensuing year.

R.A. & R.E. Annual Racket and Billiard Matches.

The results of the Racket and Billiard Matches up to and including the present year are shewn below :—

1873.

Rackets.		*Billiards.*	
Double. R.A. 1.	R.E. 4.	*Double.* R.A. 500.	R.E. 497.
Lieut. W. E. Denison.	Lieut. L. K. Scott.	Lieut.-Col. Drayson.	Capt. Seton.
" W. L. Davidson.	" S. M. Maycock.	Major Maitland.	" Mant.
Single. R.A. 2.	R.E. 3.	*Single.* R.A. 500.	R.E. 361.
Lieut. W. L. Davidson.	Lieut. S. M. Maycock.	Major Maitland.	Capt. Mant.

1874.

Rackets.		*Billiards.*	
Double. R.A. 4.	R.E. 1.	*Double.* R.A. 500.	R.E. 492.
Major Newman.	Lieut. L. K. Scott.	Major Maitland.	Capt. Warburton.
Lieut. Crookenden.	" Tower.	Lieut. Anstruther.	" Seton.
Single. R.A. 0.	R.E. 3.	*Single.* R.A. 370.	R.E. 500.
Lieut. Crookenden.	Lieut. Tower.	Major Maitland.	Capt. Warburton.

1875.

Rackets.		*Billiards.*	
Double. R.A. 0.	R.E. 4.	*Double.* R.A. 500.	R.E. 494.
Capt. Anderson.	Lieut. Tower.	Capt. Hazlerigg.	Major Warburton.
Lieut. Crookenden.	" *Hon.* M. G. Talbot.	Lieut. Anstruther.	Capt. Skinner.
Single. R.A. 0.	R.E. 3.	*Single.* R.A. 286.	R.E. 500
Capt. Anderson.	Lieut. Tower.	Lieut. Anstruther.	Major Warburton.

1876.

Rackets.		*Billiards.*	
Double. R.A. 3.	R.E. 4.	*Double.* R.A. 500.	R.E. 451.
Major Murdoch.	Lieut. Penrose.	Capt. Hutchinson.	Major Warburton.
Lieut. Anstruther.	" Onslow.	Lieut. Anstruther.	Capt. Skinner.
Single. R.A. 1.	R.E. 3.	*Single.* R.A. 479.	R.E. 500.
Major Murdoch.	Lieut. Penrose.	Lieut. Anstruther.	Major Warburton.

1879.

Rackets.		*Billiards.*	
Double. R.A. 4.	R.E. 0.	*Double.* R.A. 500.	R.E. 430.
Capt. Griffiths.	Capt. L. K. Scott.	Major Hutchinson.	Major Seton.
Lieut. D. C. Carter.	Lieut. W. A. Cairnes.	Capt. Anstruther.	Capt. Glancy.
Single. R.A. 3.	R.E. 1.	*Single.* R.A. 500.	R.E. 421.
Lieut. D. C. Carter.	Lieut. W. A. Cairnes.	Capt. Anstruther.	Capt. Glancy.

1880.

Rackets.		*Billiards.*	
Double. R.A. 4.	R.E. 0.	*Double.* R.A. 500.	R.E. 430.
Lieut. King.	Lieut. R. S. Hedley.	Major Hutchinson.	Major Manderson.
" Cooper-Key.	" W. A. Cairnes.	Capt. Anstruther.	Capt. Glancy.
Single. R.A. 0.	R.E. 3.	*Single.* R.A. 458.	R.E. 500.
Lieut. D. C. Carter.	Lieut. W. A. Cairnes.	Capt. Anstruther.	Major Manderson.

1881.

Rackets.

Double.	R.A.	4.	R.E.	0.	
Lieut. King.		Lieut. S. M. Maycock.			
" Cooper-Key.		" W. A. Cairnes.			
Single.	R.A.	3.	R.E.	1.	
Lieut. Cooper-Key.		Lieut. W. A. Cairnes.			

Billiards.

Double.	R.A.	500.	R.E.	392.
Major Hutchinson.		Capt. Glaney.		
Capt. Anstruther.		" Broadfoot.		
Single.	R.A.	500.	R.E.	468.
Capt. Anstruther.		Major Mant.		

1882.

Rackets.

Double.	R.A.	4.	R.E.	2.	
Lieut. C. D. King.		Lieut. Tower.			
" Cooper-Key.		" Friend.			
Single.	R.A.	3.	R.E.	1.	
Lieut. Cooper-Key.		Lieut. Tower.			

Billiards.

Double.	R.A.	300.	R.E.	252.
Col. Maitland.		Major Seton.		
Lieut. Bruen.		Major Glancy.		
Single.	R.A.	500.	R.E.	437.
Col. Maitland.		Major Seton.		

1883.

Rackets.

Double.	R.A.	1.	R.E.	4.	
Lieut. C. D. King.		Lieut. Tower.			
" Cooper-Key.		" Friend.			
Single.	R.A.	1.	R.E.	3.	
Lieut. C. D. King.		Lieut. Tower.			

Billiards.

Double.	R.A.	267.	R.E.	300.
Col. Maitland.		Lieut. Bor.		
Capt. Anstruther.		Lieut. Dumbleton.		
Single.	R.A.	500.	R.E.	297.
Capt. Anstruther.		Lieut. Dumbleton.		

1884.

Rackets.

Double.	R A.	3.	R.E.	4.	
Lieut. Cooper-key.		Lieut. Tower.			
" C. D. King.		" Friend.			
Single.	R.A.	2.	R.E.	3.	
Lieut. Cooper-Key.		Lieut. Tower.			

Billiards.

Double.	R.A.	277.	R.E.	300.
Lieut.-Col. Hazlerigg.		Lieut. Dumbleton.		
Capt. Anstruther.		Capt. Digby.		
Single.	R.A.	500.	R.E.	398.
Capt. Anstruther.		Lieut. Dumbleton.		

1885.

Rackets.

Double.	R.A.	4.	R.E.	2.	
Lieut. Cooper-Key.		Capt. Friend.			
" C. D. King.		Lieut. Hamilton.			
Single.	R.A.	3.	R.E.	1.	
Lieut. Cooper-Key.		Capt. Friend.			

Billiards.

Double.	R.A.	300.	R.E.	274.
Major Anstruther.		Capt. Digby.		
Capt. MacMahon.		" Baddeley.		
Single.	R.A.	500.	R.E.	248.
Major Anstruther.		Capt. Digby.		

1890.

Rackets.

Double.	R.A.	1.	R.E.	4.	
Captain Cooper-Key.		Lieut. Hedley.			
Lieut. Simonds.		" Sheppard.			
Single.	R.A.	0.	R.E.	3.	
Captain Cooper-Key.		Lieut. Hedley.			

Billiards.

Double.	R.A.	235.	R.E.	300.
Major Anstruther.		Captain Digby.		
Lieut. Lachlan.		" Dumbleton.		
Single.	R.A.	500.	R.E.	489.
Major Anstruther.		Captain Dumbleton.		

1891.

Rackets.

Double.	R.A.	2.	R.E.	4.	
Captain Cooper-Key.		Captain Hedley.			
2nd Lieut. Galloway.		2nd Lieut. Sheppard.			
Single.	R.A.	3.	R.E.	2.	
Captain Cooper-Key.		Captain Hedley.			

Billiards.

Double.	R.A.	300.	R.E.	250.
Major Anstruther.		Colonel Glancy.		
Lieut. Pollock.		Capt. Hedley.		
Single.	R.A.	414.	R.E.	500.
Major Anstruther.		Colonel Glancy.		

1892.

Rackets.

Double. R.A. 4. R.E. 0.
Captain Cooper-Key. Captain Hamilton.
Lieut. & Capt. Quinton. Lieut. Blair.
Single. R.A. 3. R.E. 0.
Captain Cooper-Key. Captain Hamilton.

Billiards.

Double. R.A. 300. R.E. 291.
Captain Curteis. Colonel Glancy.
Captain Pollock. Captain Roberts.
Single. R.A. 500. R.E. 469.
Captain Pollock. Colonel Glancy.

1893.

Rackets.

Double. R.A. 4. R.E. 1.
Captain Cooper-Key. Captain Hamilton.
Lieut. & Capt. Quinton. Lieut. Blair.
Single. R.A. 2. R.E. 3.
Captain Cooper-Key. Captain Hamilton.

Billiards.

Double. R.A. 231. R.E. 300.
Major Curteis. Major Dorward, D.S.O.
Captain Pollock. Lieut. Jones.
Single. R.A. 500. R.E. 303.
Major Curteis. Major Dorward, D.S.O.

1894.

Rackets.

Double. R.A. 1. R.E. 4.
Captain Cooper-Key. Captain Hamilton.
Captain C. D. King. Lieut. Blair.
1 Single. R.A. 3. R.E. 1.
Captain Cooper-Key. Captain Hamilton.
2 Single. R.A. 0. R.E. 3.
Lieut. Quinton. Lieut. Blair.

Billiards.

1 Single. R.A. 255. R.E. 300.
Captain Vans-Agnew. Major Dorward, D.S.O.
2 Single. R.A. 285. R.E. 300.
Major Curteis. Lieut. Jones.
3 Single. R.A. 300. R.E. 134.
Captain Lachlan. Major Ruck.

DIARY OF FIXTURES.

MAY.

Day of the Mth.	Wk.	Regimental.	Cricket, &c.	Private.
1	T	... ...	... ...	... ...
2	W	... ...	R.A. Woolwich *v.* R.N. College, at Greenwich.	... ...
3	Th	... ...	... ...	... ...
4	F	... ...	... ...	... ...
5	S	1st Div. F.A. (Aldershot) reaches Shoeburyness.	R.A. Woolwich *v.* R.A. Shoebury, at Shoebury.	... ...
6	S	... ...	... ...	... ...
7	M	Position-Finding Class joins Artillery College.	... ...	... ...
8	T	... ...	Newmarket 1st Spring Meeting begins.	... ...
9	W	... ...	... ...	... ...
10	Th	... ...	... ...	... ...
11	F	... ...	... ...	... ...
12	S	2nd Div. F.A. (Aldershot) reaches Shoeburyness, and 1st Div. R.H.A. (Aldershot) reaches Okehampton.	R.A. Woolwich Officers *v.* N.C. Officers.	... ...
13	S	Whit Sunday.	... ...	... ...
14	M	Bank Holiday.	... ...	'Ubique' Lodge Meeting at "Criterion," installation of W.M.
15	T	... ...	... ...	... ...
16	W	... ...	... ...	... ...
17	Th	... ...	... ...	... ...
18	F	... ...	... ...	... ...
19	S	3rd Div. F.A. (Weedon) reaches Shoeburyness. 1st Course of Field Gunnery begins at Okehampton.	R.A. Woolwich *v.* R.M.C., at Sandhurst.	... ...
20	S	... ...	... ...	.. ...
21	M	... ...	... ...	... ...
22	T	... ...	Newmarket 2nd Spring Meeting begins.	... ...
23	W	... ...	... ...	... ...
24	Th	... ...	... ...	... ...
25	F	... ...	R.A. *v.* Aldershot Division, at Aldershot.	... ...
26	S	4th Div. F.A. (Ipswich) reaches Shoeburyness. 1st Div. R.H.A. begins at Glenbeigh.	R.A. *v.* Aldershot Division, at Aldershot.	... ...
27	S	... ...	... ...	... ...
28	M	... ...	... ...	... ...
29	T	... ...	... ...	... ...
30	W	... ...	R.A. Woolwich *v.* Border Regiment.	... ...
31	Th	... ...	... ...	... ...

JUNE.

Day of the Mth	Wk.	Regimental.	Cricket, &c.	Private.
1	F	... ...	R.A. *v.* Greenjackets, at Winchester.	... ...
2	S	5th Div. F.A. (Colchester) reaches Shoeburyness.	R.A. *v.* Greenjackets, at Winchester.	... ...
3	S	... ...	... ...	... ...
4	M	... ...	... ...	... ...
5	T	... ...	Epsom Races begin.	... ...
6	W	2nd Div. F.A. (Sheffield) reaches Okehampton.	The Derby.	... ...
7	Th	... ...	... ...	... ...
8	F	... ...	The Oaks.	... ...
9	S	2nd Div. F.A. begins at Glenbeigh.	R.A. Woolwich *v.* R.A. Shoebury, at Woolwich.	... ...
10	S	... ...	... ...	... ...
11	M	... ...	... ...	... ...
12	T	... ...	... ...	... ...
13	W	... ...	R.A. *v.* Household Brigade, at Chelsea.	... ...
14	Th	... ...	R.A. *v.* Household Brigade, at Chelsea.	... ...
15	F	R.A.I. Annual General Meeting at R.U.S.I.	REGIMENTAL DINNER.	
16	S	Long Course goes to Lydd.	R.A. Woolwich *v.* Blackheath, at Woolwich.	... ...
17	S	... ...	... ...	... ...
18	M	... ...	R.A. *v.* M.C.C., at Lords.	... ...
19	T	... ...	R.A. *v.* M.C.C., at Lords. Ascot begins.	... ...
20	W	... ...	... ...	... ...
21	Th	... ...	... ...	'Ubique' Royal Arch Chapter meets at "Criterion," installation of Principals.
22	F	3rd Div. F.A. begins at Glenbeigh.	R.A. *v.* B.B., at Woolwich.	... ...
23	S	6th Div. F.A. (Woolwich) reaches Shoeburyness.	R.A. *v.* B.B., at Woolwich.	... ...
24	S	... ...	... ...	... ...
25	M	... ...	... ...	... ...
26	T	... ...	... ...	... ...
27	W	... ...	R.A. *v.* Yorkshire Gentlemen, at Woolwich.	... ...
28	Th	... ...	R.A. *v.* Yorkshire Gentlemen, at Woolwich.	... ...
29	F	... ...	... ...	... ...
30	S	2nd Div. arrives at Lydd. Long Course leaves Lydd.	... ...	... ...

JULY.

1	S	... ...	... ...	... ...
2	M	3rd Div. F.A. (Hilsea) reaches Okehampton.	Oxford *v.* Cambridge.	... ...
3	T	... ...	Oxford *v.* Cambridge.	... ...
4	W	... ...	Oxford *v.* Cambridge. Newmarket 1st July Meeting begins.	... ...
5	Th	4th Div. F.A. begins at Glenbeigh.	... ...	... ...
6	F	... ...	R.A. *v.* Oxford Authentics, at Woolwich.	... ...
7	S	2nd Course of Field Gunnery begins at Okehampton.	R.A. *v.* Oxford Authentics, at Woolwich.	... ...
8	S	... ...	... ...	... ...
9	M	... ...	R.A. *v.* Harlequins, at Woolwich.	... ...
10	T	... ...	R.A. *v.* Harlequins, at Woolwich.	... ...
11	W	... ...	... ...	... ...
12	Th	... ...	... ...	... ...
13	F	... ...	R.A. *v.* R.E., at Chatham. Eton *v.* Harrow.	... ...

JULY.—*Continued.*

Day of the Mth	Wk.	Regimental.	Cricket, &c.	Private.
14	S	... ...	R.A. *v.* R.E., at Chatham. Eton *v.* Harrow.	... ...
15	**S**	... ...	... ...	... ...
16	M	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich.	... ...
17	T	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich. Newmarket 2nd July Meeting begins.	... ...
18	W	... ...	R.A. Woolwich *v.* Charlton Park, at Woolwich.	... ...
19	Th	... ...	... ...	'Ubique' Mark Lodge of Mark Master Masons meets at "Criterion," installation of W.M.
20	F	... ...	... ...	... ...
21	S	... ...	R.A. Woolwich *v.* Blackheath, at Blackheath.	... ...
22	**S**	... ...	... ...	... ...
23	M	... ...	... ...	... ...
24	T	... ...	Old Shoebury Match.	... ...
25	W	... ...	Old Shoebury Match.	... ...
26	Th	... ...	... ...	... ...
27	F	4th Div. R.H.A. (Woolwich) reaches Okehampton.	R.A. *v.* Free Foresters, at Woolwich.	... ...
28	S	... ...	R.A. *v.* Free Foresters, at Woolwich.	... ...
29	**S**	... ...	... ...	... ...
30	M	... ...	R.A. *v.* Mote Park, at Maidstone.	... ...
31	T	... ...	R.A. *v.* Mote Park, at Maidstone. Goodwood begins.	... ...

AUGUST.

1	W	... ...	... ...	... ...
2	Th	... ...	... ...	... ...
3	F	... ...	R.A. *v.* R.E., at Woolwich.	... ...
4	S	... ...	R.A. *v.* R.E., at Woolwich.	... ...
5	**S**	... ...	... ...	... ...
6	M	... ...	... ...	... ...
7	T	... ...	... ...	... ...
8	W	... ...	R.A. *v.* I.Z., at Woolwich.	... ...
9	Th	... ...	R.A. *v.* I.Z., at Woolwich.	... ...
10	F	... ...	... ...	... ...
11	S	... ...	R.A. Woolwich Officers *v.* N.C. Officers.	... ...
12	**S**	.. ...	... ...	... ...
13	M	... ...	R.A. *v.* Eton Ramblers, at Woolwich.	'Ubique' Lodge Meeting at "Criterion."
14	T	... ...	R.A. *v.* Eton Ramblers, at Woolwich.	... ...
15	W	... ...	... ...	... ...
16	Th	... ...	... ...	... ...
17	F	... ...	... ...	... ...
18	S	... ...	... ...	... ...
19	**S**	... ...	... ...	... ...
20	M	... ...	... ...	... ...
21	T	5th Div. F.A. (Exeter) reaches Okehampton.	... ...	... ...
22	W	... ...	R.A. Woolwich *v.* Border Regiment.	... ...
23	Th	... ...	... ...	... ...
24	F	... ...	... ...	... ...
25	S	... ...	... ...	... ...
26	**S**	... ...	... ...	... ...
27	M	... ...	... ...	... ...
28	T	... ...	... ...	... ...
29	W	... ...	... ...	... ...
30	Th	... ...	... ...	.. ...
31	F	... ...	... ...	... ...

NOTES

FROM

CORRESPONDING MEMBERS.

The Annual General Meeting of the R.A. Institution will take place at 3 p.m. on Friday the 15th June in the Lecture Theatre of the Royal United Service Institution, Whitehall.

The Committee intend to propose the following alteration in the Rules:—

Para. 3 of Rule II. on page 2 to read—"The Committee shall have power to elect as honorary Members such gentlemen connected with Naval and Military arts and sciences as they from time to time think fit; and for short periods, officers of the Army and Navy who may be temporarily in the garrison or neighbourhood," instead of as it now stands.

After the business of the Institution is finished the R.A. Charities, R.A. Games' Fund, and R.A. Cricket Club will be considered.

Anyone wishing to raise a question or to propose a change in any of them is requested to communicate with the Hon. Secretary of the Fund concerned at Woolwich.

At the consideration of the R.A. Games' Fund mentioned above the Committee intend to ask the Meeting to approve the following:—

"That Inter-Regimental R.A. and R.E. Golf Matches be instituted to be played either once or twice a year and under such conditions as the Games' Fund Committees of the Regiment and Corps shall settle."

"That the R.A. Games' Fund give a sum, not exceeding £30, to be added to a similar sum given by the R.E. Games' Fund for the purchase of a Challenge Cup to be held by the winner of such periodical golf matches under conditions similar to those governing the Racket and Billiard Matches."

The following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893:—

Captains (*c*) and (*d*) ... price 1s. 1d.

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ROYAL ARTILLERY DINNER CLUB.

Rules.

Officers of the Royal Artillery on full or half-pay, can become annual subscribers at the rate of five shillings per annum, under the following conditions:—

(*a*) On joining the Regiment.

(*b*) If a Subaltern, by payment of five shillings for every year of service up to five years, which shall be the maximum number of years subscription chargeable to officers of that rank on joining.

(*c*) If a Captain, by payment of six years subscriptions.

(*d*) If a Major, by payment of seven years subscriptions.

(*e*) If a Lieut.-Colonel, by payment of eight years subscriptions.

THE

ROYAL ARTILLERY ANNUAL DINNER

WILL TAKE PLACE AT

QUARTER BEFORE EIGHT O'CLOCK,

On FRIDAY, 15th JUNE, 1894,

AT

THE HOTEL MÉTROPOLE

(Private Entrance in Whitehall Place),

HIS ROYAL HIGHNESS THE COLONEL OF THE REGIMENT

IN THE CHAIR.

Prices as follows:—	£	s.	d.
Subscribers	0	16	0
Non-Subscribers	1	15	0

Dinner Tickets will not be supplied, but officers are requested to give their

visiting cards at the entrance, on the evening of the dinner, to the official appointed to receive them.

It is particularly requested that officers intending to dine will furnish *early* intimation to the Honorary Secretary; and, to avoid inconvenience, it is desirable that the same should be accompanied by *cheque*, for the amount of subscription to the dinner, *except from officers who bank with Messrs. Cox & Co.*, who are informed that the amount due from them for the dinner will be charged to their accounts.

Names of officers who notify their intention of being present at the dinner cannot be removed from the list after the 12th June, and officers who omit to notify before that date will be charged an extra sum of 5s.

Advertisements will duly appear in the *Times*, *Morning Post*, and *Army and Navy Gazette*.

All communications to be addressed to

LIEUTENANT-COLONEL R. A. MONTGOMERY,
Hon. Secretary R.A. Dinner Club,
HORSE GUARDS,
WAR OFFICE, PALL MALL.

Should an officer wishing to dine have been unable to give notice before 12th June, he should inform the Secretary at the War Office direct, and not apply to the Hotel officials.

BARRACKPUR.

No. 5 Company Western Division, Royal Artillery, celebrated on Tuesday, 17th April, an event which we believe to be absolutely unparalleled in the history of the British Army.

In 1794 this Company, then designated No. 1 Company, 4th Battalion, R.A., formed part of the Duke of York's army in Flanders, which co-operated with the Russians and Austrians in the first coalition against France.

On 17th April, 1794, two columns of the Army, commanded personally by the Duke of York, marched against and took the village of Vaux. The following is an extract from Duncan's "History of the Royal Regiment of Artillery":—"One of the companies of the corps received on this day an honour unprecedented in the previous or subsequent annals of the Regiment. No. 1 Company, 4th Battalion (now 5th Company Western Division, Royal Artillery), attracted the admiration of the Duke of York to such an extent by its gallantry and skill that he made the whole army form up on the field of battle while this Company marched past him." He also published a General Order, saying.—"His Royal Highness desires that Captain Boag and Lieutenant Fead of the Royal Artillery (the officers of the company) will accept his thanks for the very spirited and able manner in which they conducted the battery entrusted to their care."

On a Review Order Parade of the Company in the morning the history of this event was read to the men by the Officer Commanding, Major W. B. Hoggan, R.A., and after marching past they were dismissed for the remainder of the day.

The officers, non-commissioned officers and men met at a supper in the evening, followed by a most enjoyable and hearty sing-song in the Royal Artillery Theatre.

DIARY OF MARCHES FROM SHORNCLIFFE TO OKEHAMPTON AND BACK.

A Correspondent writes :—

Now that the Camp at Okehampton has become an established institution, and yearly from 12 to 14 batteries proceed there from various stations to carry out their annual practice, I give here the rough diaries which I kept of the marches made by my battery to the Camp and back from Shorncliffe and Aldershot, in the hopes that they may prove of use to Battery Commanders, as to where to halt for water, and to give them some idea of the kind of roads they will have to encounter, and the distances of the various marches.

FROM SHORNCLIFFE TO OKEHAMPTON.

Shorncliffe to Ashford.

June 11th.—Left Shorncliffe at 9 a.m., and marching by Beachboro' and Postling halted at Sellinge to water and feed from 11 to 11.30 a.m. Arrived at Ashford at 1.20 p.m. Road good all the way, and fairly level. *Distance 14 Miles.*

Ashford to Maidstone.

June 12th.—Left Ashford at 8.30 a.m. and halted at Lenham from 11 to 11.35 a.m. to water and feed; but the best place to water is at Harrietsham. Arrived at Maidstone at 2.30 p.m. Road good all the way. *Distance 19 Miles.*

Maidstone to Sevenoaks.

June 13th.—Left Maidstone at 8.30 a.m., and halted at Borough Green from 11.25 to 11.55 to water and feed. Road very good all the way, but for the most part undulating, and towards the end of the march decidedly hilly. Arrived at Sevenoaks at 2 p.m. *Distance 18 Miles.*

Sevenoaks to to Red Hill.

June 14th.—Left Sevenoaks at 8 a.m. Halted at Godstone Green to water, &c., from 11.5 to 11.35 a.m. Road good and principally down hill. Reached Red Hill at 2 p.m. *Distance 18 Miles.*

Red Hill to Guildford.

June 15th.—Halted at Red Hill (Sunday).

June 16th.—Left Red Hill at 8 a.m., and halted about half-way between it and Guildford from 11.15 to 11.45 a.m. to water, &c. Marched *viâ* Reigate and Dorking, arriving at Guildford at 2 p.m. Road good, but very up and down hill. *Distance 20 Miles.*

Guildford to Farnham.

June 17th.—Left Guildford at 8.30 a.m. and marched *viâ* the Hog's Back. No water obtainable, so halted on the Hog's Back and fed only. Beautiful road the whole way. Reached Farnham at noon. *Distance 10 Miles.*

Farnham to Basingstoke.

June 18th.—Marched at 8.30 a.m. *viâ* Odiham. Halted at North Warnboro' from 11 to 11.25 to water, &c. Road very good. Reached Basingstoke at 1.20 p.m. *Distance 15 Miles.*

Basingstoke to Andover.

June 19th.—Left at 8 a.m. and marched *viâ* Whitchurch, where we halted for water, &c. from 11.10 to 11.40 a.m. Road good, but much up and down hill: drag-shoes much required. Arrived at Andover at 1.40 p.m. *Distance 18 Miles.*

Andover to Salisbury.

June 20th.—Left at 8 a.m., and halted at North Wallop (7 miles out) to water, &c., from 10 a.m. to 10.30 a.m.: this is the only place on the road where water is obtainable. Road fairly good, but up and down hill nearly the whole way. *Distance 18 Miles.*

Salisbury to Shaftesbury.

June 21st.—Left at 8.15 a.m. and halted at Fovant to water, &c., from 10.15 to 10.45 a.m., there being no other suitable watering place. Road fairly good, but towards the end there are one or two big hills to go up and down. Arrived at Shaftesbury at 2.40 p.m. Halted here for Sunday (22nd June). *Distance 21 Miles.*

Shaftesbury to Sherborne.

June 23rd.—Left at 8 a.m. and halted at Henstridge Ash (Public House) to water, &c., from 10.45 to 11.15 a.m. Road good, but very up and down hill. Here we had the best billets on the whole march. Reached Sherborne at 1.5 p.m. *Distance 16 Miles.*

Sherborne to Crewkerne.

June 24th.—Left at 8 a.m. and halted about five miles from Crewkerne at 11.10 to 11.40 a.m. to water, &c. Road good, but very up and down hill, and trying on the horses. Reached Crewkerne at —.45 p.m. *Distance 15 Miles.*

Crewkerne to Honiton.

June 25th.—Marched at 8 a.m. and halted at Yarcombe-bridge from 11.30 to noon to water, &c. This is a most trying march for both men and horses, as the road is up and down steep hills nearly the whole way, and is also most indifferent. Arrived at 3 p.m. *Distance 22 Miles.*

Honiton to Exeter.

June 26th.—Left at 8 a.m. (in a pelting rain): halted at Broadclist to water, &c., from 11 to 11.30 a.m. Road good, but in some parts rather hilly. Arrived at Exeter at 1.45 p.m. *Distance 16 Miles.*

Exeter to Okehampton.

June 27th.—Marched at 7 a.m. and halted at the Half-Way House to water, &c. from 10.30 to 11 a.m. (Here water is always ready along the roads in tubs and buckets, and the publican charges a fee of 4s. for the water, which, however, can now be recovered in the pay-list of the battery by sending on his receipt). Arrived at the Camp at 3 p.m. The road is good, but very up and down hill, and trying on men and horses, especially the long hill at the end up to the Camp. There *is* a short cut, but it is hardly ever in repair, and I would not advise its use for going up, although I tried it coming down on my return journey and saved about one mile in distance. *Distance 24 Miles.*

Note.—In marching into Exeter it is advisable to write a few days beforehand to inform the police of the arrival of the battery, and ask them to keep the billets separate, as the custom is to have two batteries billeted there on the same night, and confusion is saved in this way.—*Total Distance 266 Miles.*

The following Diary of a march from Okehampton to Shorncliffe may be useful:—

Okehampton to Exeter.

July 21st.—Left camp at 7.45 a.m. and halted at the Half-Way House from 11 to 11.45 a.m. to water and feed, and reached Exeter at 3 p.m. We came down the "short cut" from the Camp, which is a great saving in distance and time. This is not so severe a march as from Exeter to Okehampton. *Distance 23 Miles.*

Exeter to Sidmouth.

July 22nd.—Left at 8 a.m. and halted at 10.45 at a public house (about half-way) to water and feed, and reached Sidmouth at 1 p.m. Road very good, but rather hilly in places. *Distance 16 Miles.*

Sidmouth to Axminster.

July 23rd.—Left at 8 a.m. and halted at Colyton for half-an-honr at 10.45 to water, &c. Water from a brook, and very good. Out of Sidmouth there is a tremendously steep hill, and there are several other big hills, but the road is good. Arrived at 1 p.m. *Distance 15 Miles.*

Axminster. to Lyme Regis.

July 24th—Left at 8.30 and, as it was a very short march, did not halt to water or feed. Arrived at 10.30 a.m. Road good but very hilly, especially steep going into Lyme Regis. *Distance 6 Miles.*

Lyme Regis to Dorchester.

July 25th.—Left at 7.45 a.m. and halted at Bridport at 10.45 to water, &c., and again at 1.45 p.m,, and reached Dorchester at 3.40 p.m., after a most trying march for both men and horses. The roads were good, but the hills were awful, there being scarcely any level road at all for the first twenty miles. *Distance 24 Miles.*

Dorchester to Poole.

July 26th.—Left at 7.45 a.m. and halted at Bere Regis at 11 a.m. to water, &c. Arrived at Poole at 3.15 p.m. Road very good and level. Poole is a very bad place for billets, very low and rowdy. *Distance 23 Miles.*

Poole to Lymington.

July 27th (*Sunday*).—Halted at Poole.

July 28th.—Left at 7.45. Halted at 9.30 and watered in Bournemouth. Watered again at the barracks at Christchurch and fed at 11 a.m. Watered again at 2 p.m., and arrived at Lymington at 3.15 p.m. Splendid road for marching. *Distance 24 Miles.*

Lymington to Southampton.

July 29th.—Left at 8 a.m. and halted just beyond Brockenhurst at 9.30 a.m. and watered. Halted again at a public house just beyond Lyndhurst Road Station at 11 a.m. to water and feed, and arrived at Southampton at 2.30 p.m. Beautiful road, all through the New Forest. *Distance 19 Miles.*

Southampton to Havant.

July 30th.—Left at 8 a.m. and halted close to Fareham Park at 10.45 to water, &c. Reached Havant at 2.45 p.m. The road was rather up and down hill at first, but after Fareham quite level. *Distance 22 Miles.*

Havant to Arundel.

July 31st.—Left at 8 a.m. and halted at 10.45 at Chichester to water, &c. Reached Arundel at 2.30 p.m. Road good and level the whole way. *Distance 21 Miles.*

Arundel. to Brighton. *August 1st.*—Marched at 8 a.m. and halted at Sompting to water, &c. at 10.45 a.m. Reached Brighton at 3 p.m. Road good but very dusty. *Distance 22 Miles.*

Brighton to Eastbourne. *August 2nd.*—Left at 8 a.m. and halted at Newhaven to water, &c. at 10.30 a.m. Watered again at Eastdean, and reached Eastbourne at 3.15 p.m. Road good, but very up and down hill. *Distance 22 Miles.*

August 3rd (*Sunday*).—Halted at Eastbourne.

Eastbourne to Hastings. *August 4th* (*Bank Holiday*).—Marched at 8.20 and halted at Pevesney Sluice to water, &c. at 10.45 a.m. Got to Hastings at 2 p.m. Road fairly good, but hilly about Bexhill. *Distance 18 Miles.*

Hastings to Rye. *August 5th.*—Left at 8.15 a.m. and halted close to Winchelsea at 10.30 a.m. to water, &c. Arrived at noon. Road rather hilly in places, but good on the whole. *Distance 12 Miles.*

Rye to Shorncliffe. *August 6th.*—Marched at 7 a.m. and halted to water, &c. at Ivychurch at 10.30 a.m. Watered again at Dymchurch at 1 p.m., and again at Hythe at 2.30 p.m. Arrived at Shorncliffe 3.15 p.m. Road fairly good and very level the whole way. A very hard march on account of the intense heat. *Distance 27 Miles.*

Total distance marched 294 Miles.

The weather during the whole of this march was very hot and dry, and the roads as a rule very dusty, which entailed moving very slowly, and constant halts to water, &c.

The horses improved in condition very much, as the billets all along were good, and the forage plentiful and excellent.

OBITUARY.

Lieut. J. Horne, whose death occurred at Mentone on 15th April, 1894, was commissioned as 2nd Lieutenant, 15th February, 1889, and became Lieutenant, 15th February, 1892. He was placed on temporary half-pay, owing to ill health, 16th March, 1894.

Surgeon-Col. A. C. Gaye, Army Medical Staff (late R.A.), died at Bangalore, on 20th April, 1894. He joined the Army, 11th October, 1859, and served in the Perak Expedition, 1875–76, being present at the capture of Kinta (mentioned in despatches, medal with clasp); and with the Southern Afghanistan Field Force, 1880 (medal).

By his death the Institution loses the last Medical Officer on the Active list, who was a member owing to his being a Regimental Surgeon.

DIARY OF FIXTURES.

JUNE.

Day of the Mth	Wk.	Regimental.	Cricket, &c.	Private.
1	F	... ...	R.A. *v.* Greenjackets, at Winchester.	... ...
2	S	5th Div. F.A. (Colchester) reaches Shoeburyness.	R.A. *v.* Greenjackets, at Winchester.	... ...
3	S	... ...	... ...	... ...
4	M	... ...	... ...	.. ...
5	T	... ...	Epsom Races begin.	... ...
6	W	2nd Div. F.A. (Sheffield) reaches Okehampton.	The Derby.	... ...
7	Th	... ...	... ...	... ...
8	F	... ...	The Oaks.	... ...
9	S	2nd Div. F.A. begins at Glenbeigh.	R.A. Woolwich *v.* R.A. Shoebury, at Woolwich.	... ...
10	S	... ...	... ...	... ...
11	M	... ...	... ...	... ...
12	T	... ...	... ...	... ...
13	W	... ...	R.A. *v.* Household Brigade, at Chelsea.	... ...
14	Th	... ...	R.A. *v.* Household Brigade, at Chelsea.	... ...
15	F	R.A.I. Annual General Meeting at R.U.S.I.	REGIMENTAL DINNER.	
16	S	Long Course goes to Lydd.	R.A. Woolwich *v.* Blackheath, at Woolwich.	... ...
17	S	... ...	... ...	... ...
18	M	... ...	R.A. *v.* M.C.C., at Lords.	... ...
19	T	... ...	R.A. *v.* M.C.C., at Lords. Ascot begins.	... ...
20	W	... ...	... ...	... ...
21	Th	... ...	... ...	'Ubique' Royal Arch Chapter meets at "Criterion," installation of Principals.
22	F	3rd Div. F.A. begins at Glenbeigh.	R.A. *v.* B.B., at Woolwich.	... ...
23	S	6th Div. F.A. (Woolwich) reaches Shoeburyness.	R.A. *v.* B.B., at Woolwich.	... ...
24	S	... ...	... ...	... ...
25	M	... ...	... ...	... ...
26	T	... ...	... ...	... ...
27	W	... ...	R.A. *v.* Yorkshire Gentlemen, at Woolwich.	... ...
28	Th	... ...	R.A. *v.* Yorkshire Gentlemen, at Woolwich.	... ...
29	F	... ...	... ...	... ...
30	S	2nd Div. arrives at Lydd. Long Course leaves Lydd.	... ...	... ...

JULY.

Day of the Mth.	Wk.	Regimental.	Cricket, &c.	Private.
1	S	... ...	... ...	... ...
2	M	3rd Div. F.A. (Hilsea) reaches Okehampton.	Oxford *v.* Cambridge.	... ...
3	T	... ...	Oxford *v.* Cambridge.	... ...
4	W	... ...	Oxford *v.* Cambridge. Newmarket 1st July Meeting begins.	... ...
5	Th	4th Div. F.A. begins at Glenbeigh.	... ...	... ...
6	F	... ...	R.A. *v.* Oxford Authentics, at Woolwich.	... ...
7	S	2nd Course of Field Gunnery begins at Okehampton.	R.A. *v.* Oxford Authentics, at Woolwich.	... ...
8	S	... ...	... ...	... ...
9	M	... ...	R.A. *v.* Harlequins, at Woolwich.	... ...
10	T	... ...	R.A. *v.* Harlequins, at Woolwich.	... ...
11	W	... ...	... ...	... ...
12	Th	... ...	... ...	... ...
13	F	... ...	R.A. *v.* R.E., at Chatham. Eton *v.* Harrow.	... ...
14	S	... ...	R.A. *v.* R.E., at Chatham. Eton *v.* Harrow.	... ...
15	S	... ...	... ...	... ...
16	M	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich.	... ...
17	T	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich. Newmarket 2nd July Meeting begins.	... ...
18	W	... ...	R.A. Woolwich *v.* Charlton Park, at Woolwich.	... ...
19	Th	... ...	... ...	'Ubique' Mark Lodge of Mark Master Masons meets at "Criterion," installation of W.M.
20	F	... ...	... ...	... ...
21	S	... ...	R.A. Woolwich *v.* Blackheath, at Blackheath.	... ...
22	S	... ...	... ...	... ...
23	M	... ...	... ...	... ...
24	T	... ...	Old Shoebury Match.	... ...
25	W	... ...	Old Shoebury Match.	... ...
26	Th	... ...	... ...	... ...
27	F	4th Div. R.H.A. (Woolwich) reaches Okehampton.	R.A. *v.* Free Foresters, at Woolwich.	... ...
28	S	... ...	R.A. *v.* Free Foresters, at Woolwich.	... ...
29	S	... ...	... ...	... ...
30	M	... ...	R.A. *v.* Mote Park, at Maidstone.	... ...
31	T	... ...	R.A. *v.* Mote Park, at Maidstone. Goodwood begins.	... ...

AUGUST.

1	W	... ...	... ...	... ...
2	Th	... ...	... ...	... ...
3	F	... ...	R.A. *v.* R.E., at Woolwich.	... ...
4	S	... ...	R.A. *v.* R.E., at Woolwich.	... ...
5	S	... ...	... ...	... ...
6	M	... ...	... ...	... ...
7	T	... ...	... ...	... ...
8	W	... ...	R.A. *v.* I.Z., at Woolwich.	... ...
9	Th	... ...	R.A. *v.* I.Z., at Woolwich.	... ...
10	F	... ...	... ...	... ...
11	S	... ...	R.A. Woolwich Officers *v.* N.C. Officers.	... ...
12	S	.. ...	... ...	... ...

AUGUST.—*Continued.*

Day of the Mth	Wk.	Regimental.		Cricket, &c.		Private.	
13	M	...	...	R.A. *v.* Eton Ramblers, at Woolwich.		'Ubique' Lodge Meeting at "Criterion."	
14	T	...	...	R.A. *v.* Eton Ramblers, at Woolwich.		...	...
15	W	...	...	...	...	...	...
16	Th	...	...	...	...	...	...
17	F	...	...	...	...	...	...
18	S	...	...	...	...	...	...
19	**S**	...	...	...	...	...	...
20	M	...	...	...	...	...	...
21	T	5th Div. F.A. (Exeter) reaches Okehampton.		...	...	...	...
22	W	...	...	R.A. Woolwich *v.* Border Regiment.		...	...
23	Th	...	...	...	...	...	...
24	F	...	...	...	...	...	...
25	S	...	...	...	...	...	...
26	**S**	...	...	...	...	...	...
27	M	...	...	...	...	...	...
28	T	...	...	...	...	...	...
29	W	...	...	...	...	...	...
30	Th	...	...	...	...	...	...
31	F	...	...	...	...	...	...

PRÉCIS

AND

TRANSLATION.

"RUSSIAN ARTILLERY JOURNAL."

THE MILITARY TRAINING OF FIELD ARTILLERY.

TRANSLATED BY

MAJOR E. A. LAMBART, R.A.

(Continued from No. 3, Vol. XXI).

INTRODUCTORY.

In the December number of the *Russian Artillery Journal* the author of the above article, after treating in the preceding section of the general principles of the handling of artillery in the field in large bodies, goes back to details of his proposed battery drill. It should be explained that the whole essay which has run through many numbers of the journal, constitutes a revised drill-book for the Russian Artillery and will, doubtless, form the basis of the same.

Sub-Division and Section Drill.

The author lays down very detailed drill both for the sub-division and section as preliminary to battery drill.

The following are the principles of these:—

Nos. 1 to be on the flank and not in front of sub-divisions as at present, except on broken ground.

Sections. Intervals between guns either full 22 paces—reduced 10—21 paces, close—5 paces.

Sub-Division Column. 2 paces from muzzle to horse's heads. Section Commanders on left of No. 1 of leading sub-division.

Horse Artillery detachments move with the guns unless ordered "detachments rear." Pace should precede orders. If not given "walk" is understood.

Close interval. Two paces from No. 1 to hand horse.

Section Commander in front of section.

Horse Artillery detachments rear.

Battery Drill.

8-gun battery divided into two ½ batteries and four sections, viz.: —

Right flank section.	Right centre section.
Left „ „	Left „ „

6-gun battery divided in three sections, viz.:—

Right flank section.	Centre section.
Left „ „	

Sub-divisions, sections, ½ batteries, are numbered from the right in line and keep these numbers when in any column.

Three trumpeters per 8-gun battery, two per 6-gun, always accompany Battery Commander.

General Rules.

Battery Commander 25 paces in front of lead horses when advancing, but always in rear when retiring in line or column.

Intervals between sections 22 paces, but *sub-divisions* of sections may reduce intervals to 10 or 5 paces, making section intervals 34 or 39.

Section Commanders one pace in front of lead horses in line or column. Distances between sections in column 4 paces.

In action Battery Commander has no fixed position.

Section Commanders 4 paces from line of trail, but may move about.

Ammunition wagons when in action are either in rear of odd sub-divisions, facing to the rear, or in centre of sections facing the front.

When manœuvring, wagons follow in rear of right flank in single columns—in Field Batteries at 115 yards' distance. In Horse Artillery at 140 yards' distance, but advance into action in line.

Drill Movements.

The following movements are laid down for a battery:—

1.—Direct advance and retirement at the various intervals.

2.—Increase or reduction of intervals.

3.—Change of direction.

(*a.*) By the wheel about of sub-divisions.

(*b.*) By the wheel about of sections.

(*c.*) By the wheel about of the battery.

(*d.*) By the wheel of the battery right or left.

(*e.*) By the wheel of the battery right or left shoulders.

(*f.*) By the change of direction of a directing sub-division, the others conforming.

(*g.*) By following the Battery Commander, who changes his direction.

(*f.*) is carried out by the words of command, "No. — gun, lead on such and such an object. Dress by No. — gun. March."

In (*g.*) the Battery Commander simply gives "Take direction from me."

4.—Deploying and forming line from column of sub-divisions, or section and *vice versâ*.

5.—Oblique movements in line. In these the full interval is reduced to 16 paces and the close interval to 3 paces.

6.—Formation of section columns. These, as well as sub-division columns, are always formed on the move and never at the halt.

7.—Movements of a battery in section columns, and changes of directions of the same.

8.—Half battery columns of an 8-gun battery.

9.—Deployments from ditto.

10.—Oblique movements of section and half battery columns. The direction in these is preserved by the Section Commanders, their sections preserving dressing and interval from them.

It is laid down that oblique movements in column should only be employed for very short distances.

Reconnaissance of Position.

When a battery is acting independently this duty falls to the Battery Commander, and is carried out on the same principles as laid down for larger units.

As a general rule, the earlier the reconnaissance is made the better it fulfils its object.

When the Battery Commander proceeds to reconnoitre he must hand over the command to the next senior officer.

The Approach to the Position

Is carried out in "fighting formation," the 2nd line of wagons detaching itself from the battery.

The Advance into Position

Should be in line over open ground, and in column of sub-divisions over broken ground.

The first line of wagons follows the advance in column of sub-divisions, but comes up in line to the battery in action.

Coming into Action.

If it is desired to come into action to a flank from column of sub-divisions and, at the same time, at *reduced* intervals, the following method is adopted:—

When the leading gun has reached its position the order is given—"Leading gun. Halt. Dress. Close on the right of limbers (or gun-axles, centre, or wheel horses, according to the desired intervals). March."

On the command march, the 2nd gun in column moves alongside the leading one, almost at close interval, till the lead driver is opposite the limber (or gun-axle, &c.) and then halts independently. Each succeeding gun does the same as soon as the gun in front of it has halted, but till then must carefully preserve its covering to the front, keeping closed up as much as possible. The order is then given—"Action Right (or Left). March." By this means the gun intervals in action may be reduced to 17, 12, 9, or 4 paces.

Action.

After unlimbering (at "limber supply") two shell-boxes and two cartouches are removed from the limbers, which then leave the position and form up under cover, either together, in rear of battery, or in two sections, one on each flank. In the former case, they are in line at full interval; in the latter, in column of sub-divisions.

As soon as the limbers leave the battery the first line of wagons advances and forms up, facing either to the front or rear, in centre of the sections at 10 paces distance from the trails.

If there is no necessity for haste in opening fire, the limbers are left untouched and the first rounds are taken from the wagons.

"Limber supply" is used always at close ranges.

The 2nd line of wagons is established under cover at not more than 700 yards from the battery, and its commander immediately establishes connection with the battery by means of an orderly. The 2nd line should be as close to the battery as is consistent with cover.

The horses of the 1st line are unhooked and move to join the limbers.

Casualties are immediately replaced by the men and horses of the wagons.

Inspection and Review.

The battery should be formed up, with detachments mounted, in 3 lines. In the 1st line, the guns; in the 2nd, the first line of wagons, covering the right guns of sections; in the 3rd, the second line of wagons.

During the inspection the axletree numbers dismount and stand opposite their places, facing the front.

(*To be continued.*)

NOTES
FROM
CORRESPONDING MEMBERS.

The following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

"The Young Officer's 'Don't,' or Hints to Youngsters on Joining," by an Officer R.A., price 7d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893:—

Captains (*c*) and (*d*) ... price 1s. 1d.
Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

ROYAL ARTILLERY DINNER CLUB.

There were present at R.A. Dinner on 15th June, 1894:—

48 Generals.
24 Colonels.
22 Lieut.-Colonels.
34 Majors.
23 Captains.
11 Lieutenants.

Lord Roberts replied for the Regiment, and General Askwith for the Senior Officers of the Regiment.

Lord Roberts was Senior Officer on the Active List, and General Askwith Senior Officer on the Retired List.

R.A. GAMES' FUND.

The General Meeting of Subscribers to the R.A. Games' Fund was held at the R.U.S.I., on Friday, 15th June, immediately after the meetings of the R.A.I. and R.A. Charities.

The Committee presented the following report, which was adopted, and the resolutions detailed below were passed.

The accounts are shown over the page and are made up from 1st April, 1892, to 31st December, 1893; the subscriptions credited for 1892 are included in the balance in hand; the accounts cover this long period in order that they may be annually made up to 31st December instead of the 31st March.

In the Notes of R.A.I. "Proceedings," No. 14, Vol. XIX., December, 1892, an article on the Games' Fund was published, and in it was a list of grants from the fund for the previous 10 years; four of these grants are in the accompanying accounts.

In the current year five grants have already been made towards yachts, sticke, lawn tennis, and beagle kennels, and it is satisfactory to note that the receipts already amount to £180 without any supplementary lists.

The Committee would remind the Regiment that the Games' Fund was raised and is maintained by officers

i. To pay the expenses of the Inter-Regimental Matches, R.A. *v.* R.E. Rackets and Billiards.

ii. To pay the expenses of officers wishing to represent the Regiment in those matches.

iii. To assist by grants the R.A. officers at any station in any part of the world in any line of sport or recreation of such a permanent nature that the benefits of the grant will be felt by their successors.

The Committee before making any grant satisfy themselves that it is likely to be of permanent benefit, that most of the officers in the station are subscribers to the fund, and that a record of the grant will be kept in the Mess or some other permanent account book; the Committee cannot agree to the offer, frequently made, that if a grant be sanctioned many officers will subscribe to the fund.

From these remarks it may be seen that the fund is not intended to assist in providing recreation for N.-C.O's. and men, and applications for grants with this object cannot be entertained by the Committee.

The Inter-Regimental Racket and Billiard Matches were contested this year under the new system adopted, as the result of a vote taken last year throughout the subscribers to the fund.

The R.E. won two out of three events in each competition, and so hold the Cups for a year.

A combined meeting of the Committees of both R.A. and R.E. Games' Funds was held at Chatham on the first day of the matches this year, and it was agreed to submit to the respective general meetings of the funds a proposition to establish annual Inter-Regimental Matches at Golf R.A. *v.* R.E.

The General Meeting was asked and agreed

i. To approve of the institution of such matches;

ii. To allow the Committee to appoint a Sub-Committee of golf experts to confer with an R.E. Committee as to the rules and conditions under which the matches shall be played.

iii. To sanction a grant of £25 to be added to a similar sum granted by the R.E. fund to purchase a golf cup; this cup to be held in the same way as the Racket and Billiard Cups are now held.

The Committee now consists of:—

Major-General J. Alleyne, C.B., President.
Colonel G. J. Burgmann.
Lieut.-Colonel P. L. Macgregor.
Major W. F. L. Lindsay.
Major A. J. Abdy, Hon. Sec.

Number of subscribers in April, 1893 = 525.
„ „ „ „ June, 1894 = 615.

ACCOUNTS OF R.A. GAMES' FUND.

FROM 1st APRIL, 1892, TO 31st DECEMBER, 1893.

EXPENDITURE.

	£	s.	d.	£	s.	d.
Grants 1892—Lawn Tennis Courts, Trowbridge...	10	0	0			
" " —Sticke Courts, Seaforth, Liverpool...	15	0	0			
" " —Cricket Pavilion, Shoeburyness ...	25	0	0			
" " —Sticke, Spike Island...	15	0	0			
" " —Boat House, Malta	15	0	0			
" 1893—Lawn Tennis, N. Camp, Aldershot...	30	0	0			
" " —Lawn Mower, R.A. Cricket Club ...	20	0	0			
" " —Sailing Boat, Halifax N.S.	25	0	0			
" " —Lawn Tennis, N. Camp, Aldershot...	30	0	0			
				185	0	0
R.A. *v.* R.E. Matches, 1892	5	0	0			
	4	11	0			
	3	0	0			
	3	4	1			
	0	13	4			
				16	8	5
R.A. *v.* R.E. Matches, 1893	2	11	0			
	1	18	8			
	0	19	10			
	10	0	0			
	5	3	0			
	2	17	4			
	2	8	8			
	1	0	0			
	2	6	3			
	0	13	11			
	11	8	0			
				41	6	8
Clerks and Postage	2	0	0			
	1	0	0			
	0	4	6			
	0	8	8½			
				3	13	2½
Subscriptions re-credited	0	5	0			
	1	5	6			
				1	10	6
Balance credit in Secretary's hands	1	1	4½			
" " at Cox & Co.	527	18	3	528	19	7½
Total...				776	18	5

RECEIPTS.

	£	s.	d.
Balance credit 1st April, 1892, in hands of Hon. Secretary ...	0	5	0
" " " " Cox & Co.	601	1	11
Subscriptions, 1893—Cox & Co., 1st list	164	6	6
" " " 2nd list	5	5	0
" " " 3rd list	2	4	0
" " —Various officers direct...	0	5	0
" " " " "	1	1	0
" " " " "	0	6	0
" " —Arrears	2	4	0
Total...	776	18	5

HALIFAX, N.S.

Two handsomely framed and mounted photographs of Rocky Mountain scenery have been presented to the Mess. They are said to be the largest photographs in America, having been taken with a large camera, holding 48 by 20-inch plates, which the Canadian Pacific Railway had made to order for the express purpose of photographing the grand and illimitable scenery along their line.

On 10th March a concert was given for a local charity at the Academy of Music, under the patronage of General and Mrs. Montgomery Moore. All officers attending were ordered to wear uniform. Colonel Anstruther made his musical *debût* at this station, singing an Italian solo, which was encored.

There are now three R.A. officers who sing in the surpliced choir of the Garrison Chapel on Sunday evenings—Colonel Anstruther, Captain Lushington, and Lieut. Everett, I.O.M.

The closing of the skating season was marked by innumerable rink parties and hockey matches, which were continued well on to the middle of April, even when the ice was covered with an inch of water, for wet ice, though bad falling, is good skating. The R.A. and R.E. gave a rink party on 5th April, at which a diversion was created by two little bear cubs—only seven weeks old—being introduced and handed round for inspection. The King's Regiment gave another rink party on 11th April, which was the last of the season. The hockey matches always created great interest, especially among the fair sex; the sides included every possible combination of Military *v.* Civilians, and Military *v.* Military—the local Athletic Clubs, Bankers, and North-West Arm generally proving too formidable opponents. Those officers of the R.A. who played in these matches were Colonel Anstruther, Captain Lushington, Messrs. Marsh, Elliot, and Mackenzie. An unusual event, in the shape of a ladies' hockey match, took place at the Rink one day, but it was played with closed doors, and men were not admitted, so, like some of the Evangelist Mills'[1] addresses, it was for "women only."

On 25th March Lieut. Marsh returned from his five months' leave in British Columbia, where he has been roughing it on his brother's claim, and seeing something of life and travel out west in the United States.

On 1st April Captain Duffus succeeded Captain Boileau in his appointment as Adjutant R.A. in British North America, which the latter has held for five years.

On 14th April Lieut. H. M. Elliot went home on four months' leave.

On 19th April Captain and Mrs. Lowe and Miss Haddan went home *viâ* Montreal and New York, much regretted. Captain Lowe's tour of foreign service at Halifax has only extended over 10 months. Before leaving he was entertained at dinner at the Mess and the customary gun fired. He goes to join the Instructional Staff at Golden Hill.

On 23rd April an interesting military event occurred in the departure of Lieut. H. W. Gordon and 21 N.-C.O.'s and men of the R.E. for Esquimalt to construct the fortifications there, this small party being the first soldiers to cross the continent by the Canadian Pacific Railway. They were played to the station by the drums and fifes of No. 3 Company, Western Division, R.A., which have recently been organised by Captain Lushington, and under his energetic supervision attained great efficiency. Lieut. Gordon is a son of the late General Enderby Gordon, R.A., and a nephew of Chinese Gordon, the hero of Kartoum.

SHEERNESS.

THERE have been many changes lately. No. 18 Company, under the command of Captain P. H. M. Dorehill, has left for Shoeburyness, and No. 19 Company,

[1] A man of some notoriety who has been holding a religious revival at Halifax lately.

with Captain J. C. Wray in command, and Lieutenants A. R. Oldfield, D. F. Nicholl, and G. V. Clarke, has arrived from Landguard Fort; Captain W. H. Cummings has been appointed Adjutant and has joined from Dover, *vice* Lieutenant E. McM. Seddon transferred to a Field Battery.

The cricket season having opened, the golf links on the Well Marsh have been closed; the last match on the links was for a very handsome silver cigar case, presented for competition under handicap by the officers Royal Naval Barracks, this was won by Captain P. H. M. Dorehill, who deserves many thanks for the trouble he, together with Major D. C. Carter, took laying out the course.

This (the second) season's polo promises to eclipse last year's performances both in the number of ponies and quality of the play. The fact that the R.A. at Sheerness has a Polo Club is worthy of record in the "Proceedings." At present it boasts of 10 R.A. playing members, and two honorary members (one R.N. and one R.E.), with at least 24 ponies, some of which, however, have not taken very kindly to the game, but it is early in the season yet and they are sure to improve. Expensive ponies are not allowed, and the forage is managed in a highly creditable and economical way by the energetic Secretary, Lieutenant J. E. Cairnes, who buys the forage in bulk and has it issued daily by the head-groom, all owners paying a share monthly in proportion to their number of ponies and number of days in the stable. The bedding is sawdust, obtained cheap out of the dockyard, and a gunner has been found to do the shoeing.

The cricket season has opened badly, but there being so many other things to do no one practises at the net, so the Sheerness cricketers must expect to be beaten. The R.A. Woolwich sent a team on the 23rd May, defeating the home team by 17 runs. At the conclusion of the match everyone adjourned to the Racket Court, when conclusions were tried there. The Woolwich team were represented by Captain J. G. E. Wynne and Lieutenant C. C. Van-Straubenzee, and Sheerness by Captain G. Humphreys and Lieutenant J. E. Cairnes, to be decided by the best out of seven games. Result, Sheerness won by four games to nil. In spite of a cold, windy, and showery day an enjoyable day was spent.

The (Prince of Wales's Own) Norfolk Artillery left on 25th May, after three weeks encampment on the Well Marsh; with their practice and that of the 3rd Middlesex Volunteer Artillery (in barracks here for Whitsuntide), and the 1st City of London Volunteer Artillery (at Grain) a great deal of ammunition has been got through. At the Militia Athletic Sports, the Companies entered teams for the tug-of-war; comparing the strength of a Company to the Militia, some 500 strong, it was highly creditable that No. 19 Company team appeared in the final and made a splendid long stand against the Militia team, had it been a pull over instead of only a six-feet pull, the endurance of the 19 Company team would probably have succeeded in winning it. At the Naval Sports held on the Queen's Birthday, seven teams were entered; on this occasion an R.A. team had been got together and trained, and easily pulled over all they were drawn against, first the Militia team, then the Bluejackets, R.N. Barracks, and finally the *Thunderer's* team.

OBITUARY.

Lieut.-Colonel S. G. Fairtlough, died at Sierra Leone, West Africa, on 18th May, 1894. He joined the Regiment as Lieutenant, 7th July, 1869; Captain, 22nd February, 1880; Major, 22nd July, 1885, and Brevet Lieut.-Colonel, 26th March, 1894. Colonel Fairtlough commanded the operations against Fodi Silah, after which he was appointed Governor of Gambia. H.R.H. the Commander-in-Chief at the Regimental Dinner pointed out the loss the Regiment sustains by his death.

Lieutenant C. Kenny, whose death occurred at Lydd Camp, on 7th June, 1894, was commissioned as Second Lieutenant, 27th July, 1888, and became Lieutenant, 27th July, 1891. He was a young officer of great merit, and will be remembered as the writer of the Commended Essay in 1893.

Second Lieutenant C. J. Leahy, was killed riding at Lucknow, on 20th June, 1894. He was commissioned as Second Lieutenant, 23rd November, 1894.

Colonel Sir G. A. Maude, K.C.B. (retired), died in London, 31st May, 1894. He was commissioned as 2nd Lieutenant, 19th December, 1834; became 1st Lieutenant, 27th March, 1837; 2nd Captain, 1st April, 1846; Captain, 22nd December, 1850; Brevet Major, 12th December, 1854; Lieut.-Colonel, 23rd February, 1856; and Colonel, 10th June, 1861. Colonel Maude served with great distinction in the Crimea until wounded on 25th October, 1854, was Brigade Major at Woolwich from 16th December, 1854, to 22nd February, 1856, and for some years prior to his death was Crown Equerry and Secretary to the Master of the Horse. We hope to publish a Memoir of his life and services in an early number of the "Proceedings."

Colonel G. C. H. Parlby (retired), who died at Wickham Market, joined the Regiment as Lieutenant, 1st November, 1860; became Captain, 29th October, 1873; Brevet Major, 1st July, 1881; Lieut.-Colonel, 31st December, 1888; and Colonel, 10th January, 1894.

CRICKET, 1894.

GREENJACKETS *v.* ROYAL ARTILLERY.

PLAYED AT WINCHESTER, 1ST AND 2ND JUNE.

GREENJACKETS.

1st Innings.		*2nd Innings.*	
G. Soltau-Symons, b Van-Straubenzee	80	b Barnes	2
H. R. Blore, c and b Van-Straubenzee	24	c Budworth, b Barnes	0
G. L. Paget, c Wynne, b R. S. Hamilton	2	l b w, b Birley	0
Capt. R. S. Bowen, b Van-Straubenzee	6	run out	46
H.H. Prince Christian Victor, b Barnes	40	b Dorehill	6
Capt. W. Lascelles, run out	2	c and b Dorehill	3
" L. Russell, c and b R. S. Hamilton	16	c Perkins, b Dorehill	1
H. H. Farmar, c Wynne, b Barnes	4	c P. D. Hamilton, b Birley	30
Sergt. McQue, c R. S. Hamilton, b Van-Straubenzee	4	not out	52
Major E. B. Crake, not out	4	not out	18
L. Phillips, b Perkins	0		
Extras	8	Extras	20
Total	190	Total (8 wkts)	178

ROYAL ARTILLERY.

R. A. Birley, b McQue	83
C. C. Van-Straubenzee, b Russell	34
P. D. Hamilton, b Russell	8
R. S. Hamilton, c Bowen, b McQue	145
C. H. de Rougemont, b Bowen	12
A. E. J. Perkins, c and b Bowen	7
Capt. P. H. M. Dorehill, not out	54
H. M. Barnes, not out	46
T. M. Usborne, C. E. D. Budworth, Capt. J. G. E. Wynne,	Did not bat.
Extras	18
*Total (6 wkts)	407

*Innings declared closed.

ROYAL ARTILLERY *v.* ALDERSHOT DIVISION.

PLAYED AT ALDERSHOT, 25TH AND 26TH MAY.

ROYAL ARTILLERY.

1st Innings.		*2nd Innings.*	
C. C. Van-Straubenzee, c Henderson, b Woods	21	b Woods	38
W. Strong, b Finlainson	13	run out	50
Sergt.-Major Cochrane, b Finlainson	16	b Ridley	7
Major F. A. Curteis, b Woods	18	c Finlainson, b Hobson	27
C. H. de Rougemont, b Finlainson	33	b Ridley	0
A. E. J. Perkins, b Finlainson	0	not out	36
C. E. D. Budworth, b Woods	0	run out	1
T. M. Usborne, b Woods	1	b Finlainson	29
Capt. E. J. Phipps-Hornby, not out	13	b Finlainson	4
W. C. Staveley, b Finlainson	13	l b w, b Finlainson	31
Bombardier Butler, b Finlainson	0	c and b Finlainson	1
Extras	15	Extras	4
Total	143	Total	228

Aldershot Division.

1st Innings.		*2nd Innings.*	
F. G. Skipwith, b Perkins	34	b Perkins	4
Capt. Woolfe Murray, c and b Budworth	0	st Usborne, b Van-Straubenzee	15
D. M. Wood, c and b Perkins	23	b Perkins	0
Capt. Ridley, c Phipps-Hornby, b Butler	12	b Van-Straubenzee	45
E. S. Hobson, b Butler	19	st Usborne, b Van-Straubenzee	5
Col.-Sergt. White, b Perkins	1	run out	0
Corpl. Clifford, c Cochrane, b Perkins	3	c Perkins, b Van-Straubenzee	1
J. B. Finlainson, b Butler	1	st Usborne, b Perkins	1
P. Maud, b Perkins	0	b Butler	10
J. C. Howard, c Van-Straubenzee, b Butler	5	not out	20
Lord Bingham, not out	2	b Budworth	25
Extras	9	Extras	15
Total	109	Total	141

ROYAL ARTILLERY *v.* HOUSEHOLD BRIGADE.

Played at Chelsea, 13th and 14th June.

Royal Artillery.

C. C. Van-Straubenzee, b Wentworth	23
Capt. H. R. Adair, c Griffiths, b Walker	31
R. A. Birley, b Wentworth	33
A. E. J. Perkins, c Heyworth, b Studd	59
E. J. R. Peel, run out	2
C. H. de.Rougemont, c and b Studd	11
Capt. P. H. M. Dorehill, c Wentworth, b Walker	26
G. Blount, c Cumner, b Wentworth	7
T. M. Usborne, b Walker	11
E. G. Waymouth, c Studd, b Walker	1
Bombardier Butler, not out	1
Extras	12
Total	217

Household Brigade.

1st Innings.		*2nd Innings.*	
B. V. Wentworth, c Van-Straubenzee, b Adair	12	b Butler	20
F. J. Heyworth, c Peel, b Adair	9	c Van-Straubenzee, b Adair	0
J. B. Bradshaw, c de Rougemont, b Waymouth	22	c Adair, b Butler	1
H. Ruggles-Brise, c Blount, b Adair	4	c Van-Straubenzee, b Butler	6
Corpl. Walker, c and b Waymouth	9	c and b Adair	8
H. W. Studd, b Adair	0	c Butler, b Adair	0
Sergt. Cumner, b Adair	0	c and b Adair	0
C. E. Pereira, b Adair	0	b Butler	4
Private Griffiths, st Usborne, b Waymouth	0	not out	33
R. A. Markham, run out	5	b Butler	21
S. Earle, not out	8	c Usborne, b Adair	0
Extras	8	Extras	14
Total	77	Total	107

ROYAL ARTILLERY *v.* M.C.C.

Played at Lords, 18th and 19th June.

M.C.C.

1st Innings.		*2nd Innings.*	
T. C. O'Brien, c Butler, b Adair	102		
Capt. Luard, b Adair	2	c Butler, b Hine-Haycock	29
Lord Hawke, c and b Butler	7	c Adair, b Van-Straubenzee	3
G. J. Mordaunt, c and b Butler	61		
R. A. Studd, c Butler, b Quinton	26	not out	13
E. C. Mordaunt, b Adair	4		
J. M. Quinton, c Quinton, b Van-Straubenzee	29		
M. F. Ramsay, b Dorehill	15		
J. S. Russel, not out	12		
F. Walkinshaw, c and b Quinton	0		
Colonel J. Fellowes, b Butler	1		
Major W. E. Hardy, c Quinton, b Van-Straubenzee	18	not out	10
Extras	17	Extras	3
Total	294	Total	58

ROYAL ARTILLERY.

Capt. H. R. Adair, c Walkinshaw, b Quinton	55
C. C. Van-Straubenzee, b Ramsay	3
W. Strong, b Ramsay	5
F. W. D. Quinton, b E. C. Mordaunt	39
P. D. Hamilton, b Ramsay	1
V. R. Hine-Haycock, b Ramsay	6
Major F. A. Curteis, c Russel, b Ramsay	88
Capt. P. H. M. Dorehill, run out	46
A. E. J. Perkins, 1 b w, b Ramsay	2
Capt. C. D. King, not out	11
T. M. Usborne, 1 b w, b Ramsay	12
Bombardier Butler, b Ramsay	0
Extras	16
Total	284

ROYAL ARTILLERY *v.* BAND OF BROTHERS.

PLAYED AT WOOLWICH, 22ND AND 23RD JUNE.

BAND OF BROTHERS.

1st Innings.		*2nd Innings.*	
J. R. Mason, b Butler	0	c Cochrane, b Handley	31
J. N. Tonge, c Curteis, b Butler	14	c Usborne, b Butler	0
L. Wilson, c Curteis, b Butler	0	c Crampton, b Butler	26
A. M. Streatfield-Moore, c Perkins, b Butler	13	b Butler	0
F. Marchant, b Crampton	2	c Jones, b Handley	17
S. Christopherson, b Butler	26	b Handley	0
A. W. Cornwallis, not out	18	b Butler	0
Hon. F. Tufton, b Butler	0	run out	26
R. T. Denne, b Butler	1	run out	1
Colonel Fellowes, b Butler	6	not out	6
F. S. W. Cornwallis, c Butler, b Crampton	27	c Cochrane, b Handley	0
Extras	3	Extras	1
Total	110	Total	108

ROYAL ARTILLERY.

C. C. Van-Straubenzee, b Christopherson	52
Capt. C. D. King, b Mason	6
Sergt.-Major Cochrane, c Fellowes, b Christopherson	45
Major F. A. Curteis, c A. W. Cornwallis, b Fellowes	23
A. E. J. Perkins, c Tonge, b Christopherson	9
Capt. A. Handley, c and b Fellowes	12
T. M. Usborne, not out	67
Capt. F. H. Crampton, c Marchant, b Fellowes	0
Major A. J. Abdy, b Fellowes	2
Bombardier Butler, b Christopherson	23
" Jones, b Christopherson	3
Extras	14
Total	256

DIARY OF FIXTURES.

JULY.

Day of the Mth	Wk.	Regimental.	Cricket, &c.	Private.
1	S	... ...	... ...	... ...
2	M	3rd Div. F.A. (Hilsea) reaches Okehampton.	Oxford *v.* Cambridge.	... ...
3	T	... ...	Oxford *v.* Cambridge.	... ...
4	W	... ...	Oxford *v.* Cambridge. Newmarket 1st July Meeting begins.	... ...
5	Th	4th Div. F.A. begins at Glenbeigh.	... ...	... ...
6	F	... ...	R.A. *v.* Oxford Authentics, at Woolwich.	... ...
7	S	2nd Course of Field Gunnery begins at Okehampton.	R.A. *v.* Oxford Authentics, at Woolwich.	... ...
8	S	... ...	... ...	... ...
9	M	... ...	R.A. *v.* Harlequins, at Woolwich.	... ...
10	T	4th Division Course at Western Forts begins.	R.A. *v.* Harlequins, at Woolwich.	... ...
11	W	... ...	... ...	... ...
12	Th	... ...	... ...	... ...
13	F	... ...	R.A. *v.* R.E., at Chatham. Eton *v.* Harrow.	... ...
14	S	... ...	R.A. *v.* R.E., at Chatham. Eton *v.* Harrow.	... ...
15	S	... ...	... ...	... ...
16	M	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich.	... ...
17	T	... ...	R.A. *v.* R.M.A., at R.M.A., Woolwich. Newmarket 2nd July Meeting begins.	... ...
18	W	... ...	R.A. Woolwich *v.* Charlton Park, at Woolwich.	... ...
19	Th	... ...	... ...	'Ubique' Mark Lodge of Mark Master Masons meets at "Criterion," installation of W.M.
20	F	... ...	... ...	... ...
21	S	... ...	R.A. Woolwich *v.* Blackheath, at Blackheath.	... ...
22	S	... ...	... ...	... ...
23	M	... ...	... ...	... ...
24	T	... ...	Old Shoebury Match.	... ...
25	W	... ...	Old Shoebury Match.	... ...
26	Th	... ...	... ...	... ...
27	F	4th Div. R.H.A. (Woolwich) reaches Okehampton.	R.A. *v.* Free Foresters, at Woolwich.	... ...
28	S	... ...	R.A. *v.* Free Foresters, at Woolwich.	... ...
29	S	... ...	... ...	... ...
30	M	... ...	R.A. *v.* Mote Park, at Maidstone.	... ...
31	T	... ...	R.A. *v.* Mote Park, at Maidstone. Goodwood begins.	... ...

AUGUST.

Day of the Mth	Wk.	Regimental.	Cricket, &c.	Private.
1	W	... ...	... ...	... ...
2	Th	... ...	... ...	... ...
3	F	4th Division Course Western Forts ends.	R.A. *v.* R.E., at Woolwich.	... ...
4	S	5th Division Course Western Forts begins.	R.A. *v.* R.E., at Woolwich.	... ...
5	S	... ...	... ...	... ...
6	M	... ...	... ...	... ...
7	T	... ...	... ...	... ...
8	W	... ...	R.A. *v.* I.Z., at Woolwich.	... ...
9	Th	... ...	R.A. *v.* I.Z., at Woolwich.	... ...
10	F	... ...	... ...	... ...
11	S	... ...	R.A. Woolwich Officers *v.* N.C. Officers.	... ...
12	S	.. ...	... ...	... ...
13	M	... ...	R.A. *v.* Eton Ramblers, at Woolwich.	'Ubique' Lodge Meeting at "Criterion."
14	T	... ...	R.A. *v.* Eton Ramblers, at Woolwich.	... ...
15	W	... ...	... ...	... ...
16	Th	... ...	... ...	... ...
17	F	... ...	... ...	... ...
18	S	... ...	... ...	... ...
19	S	... ...	... ...	... ...
20	M	... ...	... ...	... ...
21	T	5th Div. F.A. (Exeter) reaches Okehampton.	... ...	... ...
22	W	... ...	R.A. Woolwich *v.* Border Regiment.	... ...
23	Th	... ...	... ...	... ...
24	F	... ...	... ...	... ...
25	S	5th Division Course Western Forts ends.	... ...	... ...
26	S	... ...	... ...	... ...
27	M	... ...	... ...	... ...
28	T	... ...	... ...	... ...
29	W	... ...	... ...	... ...
30	Th	... ...	... ...	... ...
31	F	2nd Division leaves Lydd.	... ...	... ...

SEPTEMBER.

1	S	... ...	... ...	... ...
2	S	... ...	... ...	... ...
3	M	... ...	... ...	... ...
4	T	... ...	... ...	... ...
5	W	... ...	... ...	... ...
6	Th	... ...	... ...	... ...
7	F	... ...	... ...	... ...
8	S	Long Course goes to Western Forts.	... ...	... ...
9	S	... ...	... ...	... ...
10	M	... ...	... ...	... ...
11	T	... ...	Doncaster Meeting begins.	... ...
12	W	... ...	St. Leger.	... ...
13	Th	... ...	... ...	... ...
14	F	... ...	... ...	... ...
15	S	... ...	... ...	... ...
16	S	... ...	... ...	... ...
17	M	... ...	... ...	... ...
18	T	... ...	... ...	... ...
19	W	... ...	... ...	... ...
20	Th	... ...	... ...	... ...
21	F	Long Course leaves Western Forts.	... ...	... ...
22	S	... ...	... ...	... ...
23	S	... ...	... ...	... ...
24	M	... ...	... ...	... ...
25	T	... ...	Newmarket 1st October Meeting begins.	... ...
26	W	... ...	... ...	... ...
27	Th	... ...	... ...	... ...
28	F	... ...	... ...	... ...
29	S	... ...	... ...	... ...
30	S	... ...	... ...	... ...

NOTES
FROM
CORRESPONDING MEMBERS.

GOLD MEDAL PRIZE ESSAY, 1895.

The Subject approved by H.R.H. The Commander-in-Chief for the "Duncan" Gold Medal Prize Essay, 1895, is as follows:—

> "The most suitable system applicable for training together in peace time the Garrison Artillery forces of the Empire, including Regular, Militia, Volunteer, and Colonial Artillery, with a view to their duties in war time in Coast Fortresses being more clearly defined."

The Rules for the Prize Essays now read:—

The Annual Gold Medal, when awarded, to be accompanied by an *honorarium* of £20; the Silver Medal by an *honorarium* of £10.

The candidates must be Officers of the Regiment who are members of the R.A. Institution.

Officers are requested to confine their Essays to about 16 printed pages of the "Proceedings;" other things being equal brevity will count towards success.

The Essays must be forwarded to the Secretary so as to reach him on or before the 1st of April.

Each Essay must be *type-written* in triplicate. The Essays must be strictly anonymous, but each to have a motto, and be accompanied by a sealed envelope with the motto written outside and the name of the writer inside; further, if the writer wishes to recover from the Committee part of the cost of type-writing his Essay he should state this fact in the same sealed envelope and write outside it, above the motto, "to be opened."

All the envelopes thus marked will be opened by the Secretary after the result of the competition has been announced, and he will send the writers the money for their type-writing expenses.

The Committee will allow a sum of £1 for type-writing each Essay.

The Essays will be submitted for decision to three Judges chosen by the Committee.

The Judges are empowered to recommend:—

1. That two Medals, one Gold and one Silver, be awarded, or
2. That only one Medal, Gold or Silver, according to the merit of the Essay, be awarded, or
3. That no Medal be awarded.

The names of the successful candidates will be announced at the Annual Meeting, and Medallists will be distinguished as such in all Lists, &c., issued from the Institution; and in the event of a University man gaining a Medal, a report of his success will be made to the University of which he may be a member.

The successful Essays will be printed and circulated to members by the Institution.

N.B.—The Committee draw particular attention to the paragraph in the Rules above on the subject of length of Essays; it is not difficult to discover the number of words in an average page of "Proceedings" matter, and so to keep an Essay within the 16 pages' limit.

During the past year the Committee R.A.I. have carried out the repair of the Congreve Clock in the Rotunda Museum, and this most beautiful piece of mechanism is now working and attracting numbers of visitors. Although it is many years since the clock was damaged and ceased to go, the fame of it has survived, and visitors who have long asked to be shown it can now see it renewed and probably as smart as when presented to the Prince Regent by Sir W. Congreve in 1808.

Thanks are due to Veterinary-Major J. C. Dwyer, A.V.D., for the great trouble he has taken in finding a capable workman with enough enthusiasm to discover the secret of the mechanism, and in superintending the proper mounting of the clock when finished.

Mr. Wegg, chronometer maker, of the New Cross Road, who carried out the repairs, must have spent more on the work than the amount allowed by Government, and is to be congratulated on the success he has achieved.

There is a common saying to the effect that everyone believes he can drive a gig better than anyone else. The study of "Hints on Driving," by Capt. C. Morley Knight, R.A., will show the large majority of drivers that they have yet something to learn. This admirable little work, just published by Geo. Bell & Sons, should be in the possession of every officer fond of horses and driving; to young officers forming a stable for the first time in India, the book will be invaluable. The clearly written letter-press is equally clearly illustrated by the sketches of Lieut. G. H. A. White, R.A., and as it is dedicated to the late D.-A.-G., R.A., Major-General Albert Williams, the book is a thoroughly Regimental production.

Its small cost of 3s. 6d. brings it within reach of all.

The following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

"The Young Officer's 'Don't,' or Hints to Youngsters on Joining," by an Officer R.A., price 7d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893:—

Captains (*c*) and (*d*) ... price 1s. 1d.
Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

POLO.

A MATCH was played at Charlton Park, on the 11th June, against a team from Hurlingham under the captaincy of Lord Harrington. In spite of heavy rain, the game proved one of the best we have had at Woolwich, and at the end of time the score was two all. The game was continued for another ten minutes, but neither side scored. After a rest for a few minutes it was decided to play on, and the visitors, owing to their superior and more numerous ponies, eventually scored. The sides were as follows :—

	R.A.	*Lord Harrington's Team.*
1.	Mr. Peel.	Mr. Lloyd.
2.	,, Gillson.	,, Cresswell.
3.	Capt. Heygate.	,, Vandeleur.
Back.	,, Hanwell.	Lord Harrington.

On the 18th June a return match was played against Fetcham Park, which, after a tie, ended in a victory for the Regiment. The sides were as follows :—

	R.A.	*Fetcham Park.*
1.	Capt. Ferrar.	Mr. Cobham.
2.	Mr. Gillson.	,, Paine.
3.	,, Aldridge.	,, Courage.
Back.	Capt. Hanwell.	,, Sheppard.

On the 9th July, the Regimental team met the 12th Lancers in the Regimental Cup at Hurlingham, and, in spite of the luck being all against them, and the ponies somewhat inferior, made a very close game of it. The score was four to two in favour of the Lancers. The teams were as follows :—

	R.A.	*12th Lancers.*
1.	Mr. Peel.	Capt. Gordon.
2.	,, Gillson.	Mr. Crawley.
3.	Capt. McKenzie.	Capt. Egerton Green.
Back.	,, Hanwell.	Mr. Wormwald.

Mr. Fordyce-Buchan, Mr. Head, and Mr. Maunsell very kindly lent their ponies to the team, for which they deserve the thanks of the Regiment. In fact, had it not been for Mr. Fordyce-Buchan's ponies the Regiment would not have entered.

The team, besides having bad luck in the game, were somewhat unfortunate in drawing such a strong regiment as the 12th, as they would probably have beaten most of the other teams.

On the 6th July, the R.A. Sheerness sent a team to play at Woolwich. The sides were as follows :—

	R.A. Woolwich.	*R.A. Sheerness.*
1.	Mr. Head.	Major Pratt.
2.	Capt. Ferrar.	Mr. Cairns.
3.	Mr. White.	Capt. Persse.
Back.	,, Aldridge.	Mr. Byron.

The home team was too good for the visitors, eventually winning by nine goals to one.

On the 16th July, the Regiment played against the Ranelagh Club, on their

ground at Barn's Elms, and won very easily by six goals to one. The sides were as follows :—

R.A.	*Ranelagh.*
1. Mr. Peel.	1. Mr. Nicholls.
2. ,, Gillson.	2. ,, Sellar.
3. Capt. McKenzie.	3. Capt. Milner.
Back. ,, Hanwell.	Back. Mr. Shepperd.

In the middle of the game Capt. Milner, unfortunately, fell and hurt his shoulder, and his place had to be taken by Capt. Daly.

R.A. WOOLWICH POLO CLUB GYMKHANA.

A most successful Gymkhana was brought off on the Polo Field, Charlton, on Tuesday, 26th June. The following six events were contested without a hitch of any sort and in good time, thanks to the arrangements of an excellent Committee, of whom Capt. Hanwell was the moving spirit.

BENDING RACE.—For Ponies, 100 yards in and out of eight spears, in heats of four.

Mr. M. C. Maunsell's Argentine .....Mr. E. J. R. Peel 1
Mr. E. S. E. W. Russell's Tewfik.....Owner 2
Capt. J. Hanwell's Chaperone .....Owner 3

Argentine won cleverly.

THE COCKSHY RACE.—By sections on horses or ponies. To ride up over two flights of hurdles and break eight cocoa-nuts, dismounting by half sections. The section quickest back over the hurdles to win.

Capt. J. Hanwell, Mr. J. F. N. Birch, Mr. G. Gillson, Mr. E. J. R. Peel 1
Capt. Kilner, Mr. M. H. Courtenay, Mr. S F. Metcalfe, Mr. C.F. P. Parry 2

Capt. Hanwell's team completed the course in 2 mins. 19 secs., taking their hurdles in perfect dressing. Capt. Kilner's team were only two seconds behind, and would certainly have won had they got over their jumps in better form.

THE "POLO SCURRY."—For *bonâ fide* Polo Ponies playing this year at Woolwich, to be nominated by a Lady present on the ground. Three furlongs. Catch weights over 11½ st. Prize to Lady.

Capt. J. Hanwell's Kathleen .....Owner 1
Capt. R. L. Heygate's Novelty.....Owner 2
Mr. H. Russell's No Name.....Owner 3

Miss Hanwell nominated Kathleen ; Mrs. Bainbridge, Novelty ; and Mrs. Russell, No Name.

Kathleen got well away, and won in a canter by a neck from Capt. Heygate on Novelty.

THE "BUTTON HOLE" RACE.—To run 50 yards, to hold ponies, with umbrella, saddle, and cigar. Saddle pony, light cigar, open umbrella, ride pony or horse to Lady, who will pin "button hole" to coat, groom holding pony or horse. Ride back to finishing point with "button hole" on, cigar alight, and umbrella up.

Mrs. Yorke and Mr. G. Gillson 1
Mrs. Dick-Cunyngham and Capt. J. Hanwell..... 2

Mr. Gillson was quickest, and won for Mrs. Yorke.

TENT-PEGGING BY TWO TEAMS.

The tent-pegging proved fairly successful. Mr. H. J. H. Winwood, who won the Tent-Pegging Cup at the Royal Military Tournament this year, led one section, while Capt. J. Hanwell, who won the same Cup last year, led the other. Capt. Hanwell's section consisted of Mr. M. H. Courtenay, Mr. F. Prendergast, and Mr. J. B. Aldridge, while Mr. Winwood had Capt. H. M. Ferrar, Mr. C. O. Head, and Mr. C. F. P. Parry. Each section first came over a hurdle in line, and took the pegs, which were placed 15 yards beyond. They then had eight pegs placed in line, the sections riding through each other in opposite directions. This they did twice, each time taking six out of the eight pegs. The two sections then went in single file passing each other in opposite directions. The two leaders set a fine example by taking five pegs running, while Capt. Hanwell finished up by taking another peg, standing up on the saddle.

THE "GRETNA GREEN" STAKES.—Gentlemen to ride a horse or pony, leading another with side saddle to a tent, where the expectant brides will be waiting in fancy costume. Gentlemen to dismount, help bride to mount, then both will ride over a hurdle to a table, where they must dismount and sign their names, returning over hurdle. First pair back to win.

Mr. Walker and Capt. H. M. Ferrar 1
Capt. J. Hanwell and Mr. G. Gillson 2

These stakes caused much amusement, the marriage ceremony being performed under a shower of rice. Mr. Walker's costume of white satin, pearls, and orange blossoms, perhaps being the most admired. Mr. Pim, unfortunately, came to grief, petticoats and all, at the first hurdle, and Mr. Gillson lost his back hair, by being hung up by the skirt in his attempt to dismount for the marriage ceremony. Capt. Ferrar and "Miss" Walker eventually won by about two lengths, Capt. Hanwell and "Miss" Gillson being second.

HALIFAX, N.S.

The late spring and late summer at Halifax this year are remarkable. In April and May continuous easterly winds prevailed, which blew the field ice on to the coast and made the weather unusually cold. This also had the effect of seriously impeding navigation, and vessels bound for Halifax were stuck in the ice outside for days together, amongst these was our crack mail steamer, the *Labrador*, which was held from 21st to 23rd April in the ice so close to port that the passengers had packed up to disembark when she first stuck. Some days the drift ice came right into the harbour, which is very unusual and was dangerous to small craft, especially in a fog. On 30th April the minimum reading of the thermometer was 19° Fahr. There were no trees in leaf until the middle of May, and no flowers or fruit until much later. A fire was found very acceptable in the Mess ante-room on 1st July.

On the 25th April, Captain G. S. Duffus, R.A., was married to Miss Corbett in St. Luke's Cathedral. The wedding was a uniform one. Lieutenant Marsh was best man, and 2nd Lieutenant Mackenzie groomsman. The R.E. as usual, always ready to identify themselves with the R.A., turned out in full force and lined one side of the aisle, the R.A. lining the other. At the conclusion of the ceremony swords were crossed for the bride and bridegroom to pass under. The carriage was drawn by N.-C.O's. of the R.A. from the church to the residence of the bride's father. The wedding present of the officers R.A. and R.E. was a set of silver dessert knives and forks with pearl handles, and the Staff-Sergeants and Sergeants

R.A. gave a useful and ornamental present, in the form of an egg-stand for the breakfast table.

The effect of the recent reorganisation of the Garrison Artillery on this station is that the Armament Major and the Instructor Depression Range-Finding are abolished, and that No. 3 Company Western Division, commanded by Major Brady, is divided into two companies, called No. 3 and No. 23. As this company was formed on the reorganisation of 1891 from three batteries, namely, Nos. 3, 23 and 24, all of the Western Division, a financial *coup* has been effected, the public is saved the cost of the Officers, Staff-Sergeants, &c., of a battery, and No. 24 Western has disappeared from the face of the earth. These stirring events were marked at Halifax by the Officers of old No. 3 Company dining together the day before the new order came into force, on the 30th April, when a special *menu* was prepared for the occasion, illustrated to show various events incidental to the change, while the company drums and fifes played in the R.A. Park between the "first and last post."

The Garrison Artillery reliefs for 1894–5 have been received here with some surprise at this station. No. 23 Company Western Division, which recently put in seven years in the West Indies, and only arrived at Halifax from St. Lucia in 1892, has been ordered back again to that undesirable island, and No. 3 Company Western Division has been ordered back to Bermuda, which was its last station before coming to Halifax in 1890. Nos. 1 and 20 Companies Western Division, which left here for Bermuda the same year, have been ordered back to Halifax again.

Major Hodgson, the late Armament Major at Halifax, has been posted, "on abolition," to No. 20 Company Western Division at Bermuda, now under orders for this station as above stated.

On 3rd May, the first salmon (weighing 15 lbs.) caught by an officer of the joint Mess was killed by Colonel Leach, R.E. The fishing this year has again been unusually late in opening, owing to the long and severe winter.

On 8th May, Colonel Isaacson returned from his tour of inspection of the Royal Artillery in the West Indies, having been absent on duty from Halifax over two months.

On 18th May, a sensational incident occurred on the banks of the La Have river, about 60 miles to the westward of Halifax, referred to as the "Battle of Bridgewater" in the local papers, which, as usual, gave a highly coloured account of the event in their own peculiar language. A military party, consisting of two Field Officers, a Captain and two soldier servants, who went salmon fishing, accompanied by two ladies, wives of the said officers, found themselves in dispute as regards the fishing rights of a certain favourite pool near Davidson's mills with a party of Nova Scotian settlers and Indians who were out in camp for the same purpose. From words they came to blows, and a free fight ensued. The opponents were five a-side, so the numbers were equal. The officers were strong and active, and one of the soldier servants happened to be the regimental bruiser, so the military eventually conquered, but not before one of the officers was gaffed in the arm by a salmon gaff, used against him as a weapon. The settlers being *settled*, were about to be thrown into the river and their tackle and boat destroyed when the mill hands marched out in a body and separated the combatants. This they did under a mistaken impression as to the rights of the case, for which the "mill boss" afterwards apologised. The behaviour of the settlers was unwarrantable. They threw rocks into the pool when one of the officers was fishing, and sent out an Indian in a boat to beat the water with a pole. They had no rights whatever on the pool, it being a case of first comer having the right to fish, and the officers arrived there before them. "After the Battle" all made friends, but the settlers were taught a lesson, and the people of Bridgewater were all delighted that anyone should have been resolute enough to teach it them.

On 24th May, the Queen's Birthday parade was held on the Common instead of in the Citadel, and the militia took part with the regulars for the first time for many years. The R.A. fired the Royal salute from two batteries of six 9-pr. R.M.L. guns drawn up on either flank, and in the march-past drew the guns past with drag-ropes, there being neither proper horses nor harness available.

SHEERNESS.

The R.A. Sheerness have been very successful in their cricket and polo matches. At cricket it is creditable to be able to record victories against such teams as the R.M.L.I. Chatham, the Royal Navy Sheerness, and the Royal Artillery Shoeburyness, are able to produce. At polo three matches out of four have been won—two against Woldingham, and one against a second team from Woolwich—but the first match at Woolwich was lost. During the last week of June the R.A. Officers held a series of entertainments, commencing on Wednesday 27th with an "At Home" on the Well Marsh, with a cricket match against the R.M.L.I. Chatham, in which the R.A. ran up a good score of 207, winning by no less than 170 runs on first innings (Mr. Byron, 52; Mr. Oldfield, 12; Corporal Davis, 52; Gunner Shaw, 15). A portion of the R.A. band played during the afternoon, and a large number of guests were present. This was followed in the evening by a most enjoyable dance in the R.A. Mess, which had been tastefully decorated for the occasion. The music was furnished by the R.A. band, and dancing was kept up with great spirit till 2 a.m. On the following afternoon a gymkhana was held on the polo ground, described in a local paper as "the Indian game of Gymkhana!" the events including a polo ball race, egg and ladle, thread and needle, ball and bucket, white tie, and run, walk, and lead races, which attracted a large concourse of spectators. On the following day, Friday, the R.A. (all officers) met the Royal Navy, on the Well Marsh, at cricket, winning by 42 runs. Major Pratt contributing the top score of 42; Major Thackeray with 23, and Mr. Oldfield, 20, gave valuable assistance; Mr. Cairnes repeated his performance against the Royal Marines by taking six of the 10 wickets. "The week" ended on Saturday with a polo match against the Woldingham Polo Club, which also ended in a victory for the R.A. by 13 goals to six. Capt. Humphreys received a severe shock by a fall during the first five minutes play, and had to be carried off the field. His place was taken by Major Pratt, the remainder of the team being Mr. Byron, back; Capt. Persse, 2; and Mr. Cairnes, 1.

On Friday, the 20th July, a second team R.A. Woolwich visited Sheerness for a return match against the R.A. Sheerness, when a very evenly-contested game was played, the home team eventually winning by six goals to five. Teams—*Woolwich:* Mr. Pim, 1; Mr. Head, 2; Mr. White, 3; and Mr. Aldridge, back. *Sheerness:* Mr. Cairnes, 1; Capt. Humphreys, 2; Capt. Persse, 3; and Mr. Byron, back.

OBITUARY.

Colonel C. H. Campbell (late Bombay), retired, died at St. Leonards, on 19th May. He joined the Bombay Artillery as 2nd Lieutenant, 12th June, 1858; became Lieutenant, 27th August, 1858; Captain, 8th January, 1870; Major, 31st December, 1878; Lieut.-Colonel, 18th June, 1884; and retired with the honorary rank of Colonel, 25th January, 1886.

Major-General W. Newman (retired), who died in London, on 15th July, joined the Regiment as Lieutenant, 31st July, 1855 ; became Captain, 3rd November, 1863 ; Major, 13th August, 1872 ; Brevet-Lieut.-Colonel, 1st July, 1881 ; Colonel, 1st July, 1885 ; and retired with the honorary rank of Major-General, 15th February, 1887. Major-General Newman served in the Egyptian Expedition of 1882 (medal, bronze star, and 3rd Class Medjidie.)

Major W. P. Platt (retired), whose death occurred on 20th May, at St. Leonards, was commissioned as Lieutenant, 25th June, 1862 ; became Captain, 8th September, 1875 ; Major, 10th April, 1882, and retired 24th January, 1883. Major Platt served in the Hazara Campaign of 1868 (medal, with clasp).

Major-General G. Rotton (retired), died suddenly at Homburg, on 9th July. He joined the Regiment as 2nd Lieutenant, 17th June, 1843 ; became Lieutenant, 5th April, 1845 ; 2nd Captain, 2nd July, 1851 ; Captain, 1st April, 1855 ; Brevet-Major, 13th April, 1858 ; Lieut.-Colonel, 15th February, 1861 ; Colonel, 21st September, 1867 ; and retired on full pay with the honorary rank of Major-General, 10th March, 1875. Major-General Rotton served at Canton with the force under Rear-Admiral Seymour, in 1856–57 ; and was present at the capture of Canton in December, 1857 ; in the China War of 1860, including the action of Sinho, taking of Tangku, and capture of the Taku Forts (brevet of Lieut.-Colonel, medal, with two clasps).

CRICKET, 1894.

The variable state of the weather is responsible for the disappointing tale of drawn matches recorded below.

ROYAL ARTILLERY *v.* YORKSHIRE GENTLEMEN.

PLAYED AT WOOLWICH, 27TH AND 28TH JUNE.

ROYAL ARTILLERY.

1st Innings.		*2nd Innings.*	
Capt. J. P. DuCane, b Young	3		
R. A. Birley, b Carter	0	c Lawson-Smith, b Firth	18
C. H. de Rougemont, c Landon, b Aitken	24	run out	22
A. E. J. Perkins, b Carter	35	not out	11
Capt. H. R. Adair, c and b Young	35	b Young	59
" C. D. King, b Carter	36	b Young	0
" P. H. M. Dorehill, c and b Dickson	28	b Dickson	55
Major F. A. Curteis, c Firth, b Dickson	13	c Aitken, b Young	13
Capt. J. G. E. Wynne, c and b Dickson	22		
T. M. Usborne, b Dickson	1	c Firth, b Young	21
Bombardier Butler, not out	3		
Extras	25	Extras	13
Total	285	*Total (7 wkts)	212

*Innings declared closed.

YORKSHIRE GENTLEMEN.

1st Innings.		*2nd Innings.*	
H. W. Dickson, b Butler	27	b Dorehill	2
G. H. Aitken, l b w, b Butler	5	b Butler	32
E. M. Lawson-Smith, l b w, b Butler	3	not out	23
Rev. E. B. Firth, l b w, b Butler	8	b Butler	7
C. W. Landon, b Adair	25	b Butler	12
E. M. Young, b Butler	0	c Adair, b Dorehill	2
Hon. C. Lambton, b Adair	50	b Butler	2
T. P. Cooke, c Usborne, b Butler	6	b Butler	11
C. P. Sykes, b Adair	8	st Usborne, b Dorehill	0
W. Carter, b Adair	8	not out	1
G. A. B. Leatham, not out	3	b Adair	23
Extras	13	Extras	11
Total	156	Total (9 wkts)	131

ROYAL ARTILLERY *v.* OXFORD AUTHENTICS.

PLAYED AT WOOLWICH, 6TH AND 7TH JULY.

ROYAL ARTILLERY.

C. C. Van-Straubenzee, c Bosworth-Smith, b Wood	117
A. E. J. Perkins, b Wood	16
C. H. de Rougemont, b Wood	90
Major F. A. Curteis, b Fowler	12
Capt. C. D. King, c Bolitho, b Wood	19
" J. G. E. Wynne, b Fowler	51
Bombardier Butler, not out	0
H. D. White-Thomson, b Fowler	0
C. Prescott-Decie, c Fowler, b Wood	1
Capt. F. H. Crampton, b Wood	0
" A. Handley, c Wood, b Bosworth-Smith	37
Extras	19
Total	362

OXFORD AUTHENTICS.

1st Innings.		*2nd Innings.*	
G. Fowler, b Butler	10	c King, b Butler	2
R. S. H. Baiss, c Van-Straubenzee, b Butler	13	c Curteis, b Butler	151
B. N. Bosworth-Smith, b Handley	22	c Perkins, b Handley	14
J. B. Wood, b Handley	21	l b w, b Van-Straubenzee	0
W. E. T. Bolitho, c Van-Straubenzee, b Butler	0	c Curteis, b Prescott-Decie	22
R. H. Raphael, b Handley	24	b Handley	0
J. M. Quinton, b Handley	30	b Prescott-Decie	51
E. P. Fitzgerald, c and b Butler	1	c Curteis, b Handley	1
E. P. Smith (sub.), b Handley	5		
P. C. Smith, c and b Butler	0	not out	6
J. P. H. Lonsdale, not out	9	not out	15
Extras	2	Extras	16
Total	127	Total (8 wkts)	273

ROYAL ARTILLERY *v.* OXFORD HARLEQUINS.

PLAYED AT WOOLWICH, 9TH AND 10TH JULY.

OXFORD HARLEQUINS.

1st Innings.		*2nd Innings.*	
C. H. R. Seymour, c King, b Handley	3	c King, b Prescott-Decie	33
A. J. Webbe, c King, b Butler	27	c King, b Prescott-Decie	1
J. G. Walker, c de Rougemont, b Butler	19	c King, b Prescott-Decie	2
H. Philipson, c and b Butler	0	c de Rougemont, b Crampton	19
F. G. H. Clayton, c Curteis, b Prescott-Decie	5	c Van-Straubenzee, b Prescott-Decie	5
W. E. T. Bolitho, l b w, b Crampton	21	c Handley, b Crampton	57
H.H. Prince Christian, c and b Butler	39	c Perkins, b Prescott-Decie	21
J. Robertson-Walker, c and b Crampton	0	b Crampton	24
Capt. G. Webbe, c Handley, b Butler	9	b Curteis	23
G. F. H. Berkeley, b Prescott-Decie	10	c Van-Straubenzee, b Butler	9
W. J. Seton, not out	1	not out	4
Extras	12	Extras	11
Total	146	Total	209

ROYAL ARTILLERY.

1st Innings.		*2nd Innings.*	
Major F. A. Curteis, c Philipson, b Webbe	9	l b w, b Berkeley	8
C. C. Van-Straubenzee, c Prince Christian, b Clayton	45	not out	23
Sergt.-Major Cochrane, c Walker, b Clayton	40	not out	19
Capt. P. H. M. Dorehill, run out	20		
" C. D. King, b Clayton	18		
C. H. de Rougemont, b Clayton	17		
C. Prescott-Decie, not out	6		
A. E. J. Perkins, c and b Berkeley	3		
Capt. A. Handley, c and b Berkeley	6		
" F. H. Crampton, b Berkeley	0		
Bombardier Butler, c G. Webbe, b Berkeley	5		
Extras	8	Extras	5
Total	177	Total (1 wkt)	55

ROYAL ARTILLERY *v.* ROYAL ENGINEERS.

PLAYED AT CHATHAM, 13TH AND 14TH JULY.

ROYAL ARTILLERY.

1st Innings.		*2nd Innings.*	
Capt. H. R. Adair, b Hedley	7	c Rawson, b Woodroffe	15
C. C. Van-Straubenzee, b Woodroffe	34	not out	8
Sergt.-Major Cochrane, c Rawson, b Bayfield	3		
Capt. F. W. D. Quinton, b Bayfield	4		
Major F. A. Curteis, c Rawson, b Pilcher	20		
Capt. P. H. M. Dorehill, not out	20		
W. Strong, b Hedley	14		
R. S. Hamilton, run out	0		
C. H. de Rougemont, b Pilcher	0		
C. Prescott-Decie, c Dumbleton, b Bayfield	2		
Bombardier Butler, b Pilcher	1		
Extras	17	Extras	0
Total	122	Total (1 wkt)	23

ROYAL ENGINEERS.

Major Friend, run out	38
Capt. Dumbleton, c de Rougemont, b Dorehill	44
Capt. Hamilton, run out	3
M. O'C. Tandy, b Butler	5
Capt. Hedley, b Butler	19
E. M. Blair, l b w, b Van-Straubenzee	49
Corpl. Bayfield, b Adair	1
C. N. North, c and b Adair	2
A. J. Woodroffe, b Butler	21
Major Rawson, not out	31
A. J. Pilcher, not out	16
Extras	11
*Total (9 wkts)	240

* Innings declared closed.

Officers who were not present at the Annual General Meeting of the Institution on the 15th June last, when among other Clubs the R.A. Cricket Club was mentioned, are informed that the attention of all cricketers was called to the state of the Cricket Pavilion at Woolwich and of the fund to support it. The Pavilion has been erected 21 years and, being thatched, will before very long require a large sum to be expended on it. The only source of income is from entrance donations of officers joining ; these become fewer each year and barely suffice to cover the normal expenses, so the Regiment should begin to consider the question of how to place it in a state of thorough repair.

NOTES
FROM
CORRESPONDING MEMBERS.

THERE is a typographical error in Chapter VI. of Memoirs Historical and Biographical—The Brome-Walton Family. On page 455 of this month's Number R.A.I. "Proceedings," line 32, *for* 1782 *read* 1802, so that the sentence now runs—

"in 1783 it continued in use until 1802."

THE following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

"The Young Officer's 'Don't,' or Hints to Youngsters on Joining," by an Officer R.A., price 7d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893:—

Captains (*c*) and (*d*) ... price 1s. 1d.
Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

ROYAL ARTILLERY WOOLWICH POLO CLUB.

SECOND GYMKHANA.

THE second meeting was held in Charlton Park, on Tuesday, 24th July, 1894, and proved a great success.

The events and winners were as follows:—

The Triangle Stakes—Competitors to draw lots whether they run or ride. Horse or pony may be used. Course: once round an equilateral triangle of 22 yards per side. 1st and 2nd prizes:—1, Mr. Head; 2, Mr. Aldridge.

Mr. Head won, thanks to a very handy pony. The ponies and horses won most of the heats, although the finishes were generally pretty close. 17 started.

The Dinner Stakes—A Flat Race for all Ponies; about three furlongs. Competitors to change ponies as drawn by lot. No whips or spurs allowed. The owner of the first pony to give a dinner to the owner of the last. The rider of the last to give a dinner to the rider of the first. Prize: four theatre tickets, to go to owners and riders of the last and first ponies.

Mr. Aldridge, on Mr. Pim's Bismillah got home first, while his own pony, ridden by Mr. Hooper, was last. As rider of the first, Mr. Aldridge wins one dinner from Mr. Hooper, the rider of the last; and, as owner of the last, he gets another from Mr Pim, the owner of the first.

Sword Competition—To cut heads and posts, gallop round a flag, cut a lemon, jump a hurdle, and take a peg. Time allowed, 30 seconds. 1st and 2nd prizes:—1, Captain Hanwell; 2, Mr. Winwood; 3, Captain Ferrar.

Captain Hanwell won, doing a clear run in his second turn. Mr Winwood was second, while Captain King, Captain Ferrar, Mr. Aldridge, and Mr. Head also did very well. 12 started.

The Ride and Picket Stakes—Once round the Polo Ground. One to ride on and picket pony or horse, partner to follow on foot. Each must ride twice and run twice at least. First pair home to win. Competitors to provide their own pegs and hammers. Two prizes:—1, Captain Hanwell and Captain Furse; 2, Mr. Head and Mr. Aldridge; 3, Mr. Thwaites and Mr. Tyler.

This caused a lot of amusement, several competitors finishing on the wrong horses. Captains Hanwell and Furse eventually won rather easily. 12 started.

Cockshy Stakes—By sections, on horses or ponies. As last time, with dolls to throw at, instead of cocoanuts, one prize:—1, 58th Field Battery; 2, 1st Depot.

No less than eight teams started, with Field Officers well to the front. The 58th Field Battery won in 2 min. 24 secs. The 1st Depot being second in 2 min. 31 secs.

Costume Race—Lady and Gentleman to stand together. Gentleman will run to his horse or pony, which will be held by groom, ride 200 yards, bring back a parcel containing a fancy costume. Lady will undo parcel and help Gentleman to dress. He must then remount and ride to winning post. 1st and 2nd prizes to go to Lady:—1, Mrs. Paget and Mr. Van Straubenzee; 2, Mrs. Hansard and Captain Hanwell; 3, Mrs. Lyon and Mr. Hooper. 18 started.

Some of the costumes were truly wonderfully and fearfully made, but, luckily, the Lord Chamberlain was not present. Mr. Straubenzee won for Mrs. Paget, in a tasty pair of stays and a poke bonnet. Captain Hanwell, in the latest thing, in night-shirt and a mortar-board cap, getting the second prize for Mrs. Hansard.

OBITUARY.

Colonel G. R. Gambier, who died at sea, between Bombay and Aden, on 9th August, joined the Madras Artillery as Lieutenant, 8th June, 1860; became Captain, 2nd November, 1872; Major, 12th December, 1880; Lieut.-Colonel, 31st March, 1888; and Colonel, 29th September, 1893. Colonel Gambier served in the Afghan War (medal).

Major-General R. C. Romer, died at Reading, on 21st August. He was commissioned as 2nd Lieutenant, 16th June, 1838; became Lieutenant, 20th July, 1840; 2nd Captain, 15th March, 1847; Captain, 21st July, 1853; Major, 26th October, 1858; Lieut.-Colonel, 16th January, 1859; Colonel, 16th January, 1864; and retired on full pay with the honorary rank of Major-General, 11th June, 1877.

CRICKET, 1894.

ROYAL ARTILLERY *v.* ROYAL MILITARY ACADEMY.

PLAYED AT R.M.A., WOOLWICH, 16TH AND 17TH JULY.

ROYAL MILITARY ACADEMY.

1st Innings.		*2nd Innings.*	
W. L. Foster, c Perkins, b Crampton	30	c and b Waymouth	30
L. K. Stanbrough, b Van-Straubenzee	6	c and b Adair	0
B. H. Bignell, c Waymouth, b Adair	34	c and b Adair	8
E. M. Birch, c and b Crampton	0	run out	3
A. W. Disney-Roobuck, b Holman	0	b Waymouth	2
S. D. Barrow, b Adair	22	c Adair, b Van-Straubenzee	11
G. F. Clayton, c Waymouth, b Adair	0	l b w, b Crampton	1
E. H. Rooke, b Holman	2	c Van-Straubenzee, b Adair	12
R. Ramsden, b Adair	0	not out	7
F. D. Logan, b Holman	4	b Van-Straubenzee	7
K. Kirke, not out	0	b Van-Straubenzee	0
Extras	6	Extras	8
Total	104	Total	89

ROYAL ARTILLERY.

1st Innings.		*2nd Innings.*	
C. C. Van-Straubenzee, b Rooke	17	not out	57
Capt. H. R. Adair, c Logan, b Rooke	15	b Kirke	8
Major W. N. Lloyd, b Rooke	11	b Stanbrough	14
" F. A. Curteis, c and b Kirke	7	b Kirke	7
Capt. C. D. King, c Ramsden, b Kirke	11	b Stanbrough	0
A. E. J. Perkins, c Barrow, b Kirke	1		
B. W. Holman, c Bignell, b Kirke	3		
Major F. L. Cunliffe, b Kirke	4		
Capt. A. Handley, not out	7	not out	0
E. G. Waymoutb, run out	0		
Capt. F. H. Crampton, b Stanbrough	19		
Extras	6	Extras	10
Total	101	Total	96

ROYAL ARTILLERY (WOOLWICH) *v.* CHARLTON PARK.

PLAYED AT WOOLWICH, 18TH JULY.

ROYAL ARTILLERY.

1st Innings.		*2nd Innings.*	
Capt. H. R. Adair, b Holton	14		
Major F. L. Cunliffe, c and b Holton	6		
Capt. J. G. E. Wynne, b Holton	26		
Major F. A. Curteis, b Holton	4		
E. P. Smith, b Burnett	1		
C. C. Van-Straubenzee, run out	7	not out	65
Capt. C. D. King, b Burnett	0	not out	31
Major A. J. Abdy, b Holton	6		
Capt. W. L. H. Paget, b Holton	2		
C. F. P. Parry, b Holton	0		
Capt. F. H. Crampton, not out	6	l b w, b Holton	15
Extras	0	Extras	6
Total	77	*Total (for 1 wicket)	117

* Innings declared closed.

CHARLTON PARK.

1st Innings.		*2nd Innings.*	
A. H. Pease, b Adair	23	b Crampton	34
H. E. Lawrence, b Adair	2	c Straubenzee, b Adair	6
A. J. Dodd, run out	0		
F. W. P. Holton, c Parry, b Van-Straubenzee	4	not out	6
St. J. Scott, run out	40		
S. Castle, b Adair	0	not out	42
C. H. Chauncy, c Crampton, b Adair	0		
R. G. Cowley, b Adair	0		
W. J. C. Keats, c Smith, b Curteis	17		
A. Burnett, not out	4		
A. Jolly, b Curteis	0		
Extras	10	Extras	9
Total	100	Total (for 2 wickets)	97

ROYAL ARTILLERY (WOOLWICH) *v.* BLACKHEATH.

PLAYED AT BLACKHEATH, 21ST JULY.

ROYAL ARTILLERY.

Capt. H. R. Adair, c and b Philcox	87
Bombardier Butler, c C. E. Mason, b Philcox	6
A. E. J. Perkins, b Hemmerde	1
Major F. A. Curteis, c A. W. Stewart, b Hemmerde	29
Capt. C. D. King, c A. W. Stewart, b Hemmerde	0
C. C. Van-Straubenzee, c A. W. Stewart, b J. R. Mason	84
Capt. A. Handley, run out	8
Major A. J. Abdy, c R. A. Fegan, b J. R. Mason	7
Capt. F. H. Crampton, c Philcox, b J. R. Mason	0
E. P. Smith, not out	6
C. F. P. Parry, c R. A. Fegan, b J. R. Mason	4
A. E. Harrison, not out	0
Extras	5
*Total (for 10 wickets)	237

* Innings declared closed.

BLACKHEATH.

S. Castle, c Van-Straubenzee, b Butler	4
D. Ronald, c King, b Adair	11
J. R. Mason, c King, b Adair	26
E. A. Philcox, c Handley, b Butler	16
J. H. C. Fegan, c Perkins, b Butler	11
R. B. Stewart, b Crampton	0
H. R. Blaker, c Van-Straubenzee, b Butler	24
C. L. Hemmerde, not out	16
J. H. W. Davies, c Curteis, b Butler	2
A. W. Stewart, b Butler	33
C. E. S. Mason, not out	4
R. A. Fegan did not bat.	
Extras	4
Total (9 wickets)	151

ROYAL ARTILLERY *v.* FREE FORESTERS.

PLAYED AT WOOLWICH, 27TH AND 28TH JULY.

ROYAL ARTILLERY.

1st Innings.		*2nd Innings.*	
Capt. H. R. Adair, b Collins	16	not out	21
C. C. Van-Straubenzee, c Walker, b Collins	7	c Walker, b Orlebar	27
C. H. de Rougemont, b Hornsby	56	not out	12
Major F. A. Curteis, c Russell, b Collins	13		
Capt. C. D. King, c Cuthbertson, b Hornsby	39		
A. E. J. Perkins, b Collins	0		
Capt. J. G. E. Wynne, c Headlam, b Hornsby	10		
R. A. Birley, b Hornsby	3		
Capt. F. H. Crampton, run out	0		
" A. Handley, c Don Wauchope, b Collins	4		
Bombardier Butler, not out	0		
Extras	21	Extra	1
Total	160	Total (1 wicket)	61

Free Foresters.

1st Innings.		*2nd Innings.*	
J. H. J. Hornsby, b Butler	3	c Van-Straubenzee, b Butler	15
J. S. Russell, b Butler	0	b Butler	9
Capt. Cuthbertson, l b w, b Butler	7	c Crampton, b Adair	8
E. T. Orlebar, b Butler	0	b Crampton	44
F. W. Burbury, c King, b Adair	0	b Adair	9
J. G. Walker, c Van-Straubenzee, b Adair	4	b Crampton	22
H.H. Prince Christian Victor, b Handley	14	c sub., b Butler	13
A. J. Boger, c Butler, b Adair	1	b Crampton	15
A. R. Don Wauchope, c Van-Straubenzee, b Adair	12	b Crampton	3
C. Headlam, b Adair	0	b Crampton	6
W. E. W. Collins, not out	15	not out	13
Extra	1	Extras	6
Total	57	Total	162

ROYAL ARTILLERY *v.* THE MOTE.

Played at Mote Park, Maidstone, 30th and 31st July.

Royal Artillery.

1st Innings.		*2nd Innings.*	
Capt. H. R. Adair, b Jones	5	b Hall	12
" F. H. Crampton, c Wakeley, b Turner	2	handled ball	0
E. P. Smith, b Jones	0	b Turner	2
Bombardier Osmond, b Winch	5	c Atkins, b Jones	27
C. H. de Rougemont, ht wkt, b Turner	22	c Spens, b Turner	76
C. C. Van-Straubenzee, c Spens, b Turner	6	c Atkins, b Turner	9
A. E. J. Perkins, c Hickmott, b Turner	10	b Turner	1
B. W. Holman, c Hall, b Turner	0	b Jones	4
Major A. J. Abdy, b Turner	0	b Jones	39
Capt. W. L. H. Paget, not out	3	b Jones	0
Bombardier Butler, st Hickmott, b Winch	0	not out	3
Extras	11	Extras	5
Total	64	Total	178

The Mote.

1st Innings.		*2nd Innings.*	
F. M. Atkins, c Van-Straubenzee, b Butler	33	not out	31
R. M. Wakeley, c Adair, b Butler	20		
R. P. Spurway, c Van-Straubenzee, b Holman	35	not out	31
A. M. Streatfield, ht wkt, b Holman	43		
Major S. S. Spens, c Van-Straubenzee, b Butler	1		
J. A. Turner, c Van-Straubenzee, b Osmond	14		
K. McAlpine, b Adair	1		
E. Hickmott, b Osmond	27		
E. B. Winch, b Osmond	7		
J. G. Jones, not out	5		
G. D. Hale, b Osmond	8		
Extras	4	Extras	3
Total	198	(Total no wicket)	65

ROYAL ARTILLERY *v.* ROYAL ENGINEERS.

Played at Woolwich, 3rd and 4th August.

Royal Artillery.

1st Innings.		*2nd Innings.*	
W. Strong, b Bayfield	11	c Rawson, b Bayfield	49
C. C. Van-Straubenzee, l b w, b Woodroffe	5	b Bayfield	3
C. H. de Rougemont, b Woodroffe	0	c Rawson, b Bayfield	0
F. W. D. Quinton, not out	122	c Rawson, b Woodroffe	7
Capt. P. H. M. Dorehill, l b w, b Woodroffe	26	run out	0
Sergt.-Major Cochrane, b Bayfield	9	not out	11
Capt. C. D. King, c Tandy, b Hamilton	50	not out	27
Major F. A. Curteis, c Rawson, b North	1	b Bayfield	3
E. G. Waymouth, b North	1		
Bombardier Butler, b Woodroffe	1		
Capt. F. H. Crampton, b Bayfield	0		
Extras	21	Extras	9
Total	247	*Total (6 wickets)	109

* Innings declared closed.

ROYAL ENGINEERS.

1st Innings.		*2nd Innings.*	
C. N. North, b Quinton	47	c Van-Straubenzee, b Crampton	7
Major Friend, c Waymouth, b Butler	9	b Waymouth	1
Capt. Hamilton, l b w, b Butler	0	b Butler	5
E. M. Blair, c and b Waymouth	29	not out	31
M. O. C. Tandy, b Quinton	22	not out	8
Capt. Stafford, c and b Quinton	5		
Corpl. Bayfield, b Butler	25		
Capt. Rice, b Waymouth	4		
A. J. Woodroffe, not out	24		
Major Rawson, c Butler, b Waymouth	14		
A. J. Pilcher, c Quinton, b Waymouth	2		
Extras	4	Extras	1
Total	185	Total (3 wickets)	53

ROYAL ARTILLERY *v.* I ZINGARI.

PLAYED AT WOOLWICH, 8TH AND 9TH AUGUST.

I ZINGARI.

1st Innings.		*2nd Innings.*	
H. T. Hewett, b Prescott-Decie	31	run out	0
F. A. Soames, c King, b Prescott-Decie	5	c Van-Straubenzee, b Prescott-Decie	0
G. J. Mordaunt, c Van-Straubenzee, b Prescott-Decie	0	c and b Prescott-Decie	0
F. W. Maude, l b w, b Prescott-Decie	19	c King, b Butler	3
A. G. G. Asher, b Butler	12	c King, b Prescott-Decie	0
S. W. Catley, b Prescott-Decie	7	c Van-Straubenzee, b Butler	5
C. C. Clarke, not out	13	c Curteis, b Butler	17
L. K. Jarvis, c DuCane, b Prescott-Decie	4	c Van-Straubenzee, b Prescott-Decie	7
H. J. Roberts, b Prescott-Decie	4	c de Rougemont, b Prescott-Decie	35
R. Mitchell, c Butler, b Prescott-Decie	0	b Prescott-Decie	1
Major R. Bannatine-Allason, b Prescott-Decie	3	run out	7
J. A. Turner, b Prescott-Decie	5	not out	7
Extras	4	Extras	6
Total	107	Total	88

ROYAL ARTILLERY.

1st Innings.		*2nd Innings.*	
Capt. J. P. DuCane, c Clarke, b Maude	0	c Clarke, b Maude	5
Major F. A. Curteis, c Asher, b Soames	5	b Maude	21
C. H. de Rougemont, c Maude, b Soames	23	c and b Maude	7
C. C. Van-Straubenzee, c Mordaunt, b Soames	3	c Hewett, b Soames	1
Capt. C. D. King, c Clarke, b Asher	22	st Clarke, b Asher	17
A. E. J. Perkins, c Mitchell, b Soames	3	b Maude	0
Capt. A. Handley, c Mordaunt, b Soames	15	c Hewett, b Maude	4
C. Prescott-Decie, not out	34	b Maude	0
Major F. H. Hall, b Maude	3	b Asher	10
Capt. F. H. Crampton, c Maude, b Turner	0	c Asher, b Maude	15
Bombardier Butler, c Mordaunt, b Soames	29	c Clarke, b Maude	0
N. E. B. Bellairs, b Soames	4	not out	1
Extras	7	Extras	3
Total	148	Total	84

ROYAL ARTILLERY *v.* ETON RAMBLERS.

PLAYED AT WOOLWICH, 13TH AND 14TH AUGUST.

ETON RAMBLERS.

G. B. Gosling, run out	18
R. A. Studd, run out	2
Hon. F. Egerton, c Butler, b Adair	10
Hon. M. Tollemache, b Dorehill	23
F. A. Soames, b Perkins	72
A. T. B. Dunn, c and b Perkins	95
G. A. Foljambe, b Perkins	13
R. W. Mitchell, c and b Perkins	1
Lieut. E. P. Smith (R.A.), b Perkins	2
A. W. F. Baird, not out	19
R. A. H. Mitchell, b Perkins	36
Extras	27
Total	318

Royal Artillery.

1st Innings.		*2nd Innings.*	
C. C. Van-Straubenzee, b Foljambe	11	b Soames	4
Major F. A. Curteis, b Dunn	41	c Dunn, b Foljambe	74
Capt. J. P. DuCane, c Dunn, b Foljambe	9	c Baird, b Dunn	10
" P. H. M. Dorehill, b Soames	11	b Foljambe	33
" C. D. King, b Dunn	11	c Baird, b Foljambe	13
" H. R. Adair, b Soames	3	c and b Soames	0
Bombardier Osmond, not out	7	b Soames	0
Capt. J. G. E. Wynne, b Soames	7	c Mitchell, b Foljambe	4
A. E. J. Perkins, b Dunn	3	b Soames	14
Major A. J. Abdy, b Dunn	11	not out	3
Bombardier Butler, b Soames	0	c Gosling, b Soames	5
Extras	14	Extras	21
Total	128	Total	181

PRÉCIS

AND

TRANSLATION.

A RUSSIAN OPINION OF THE CHINESE ARMY.

TRANSLATED BY

LIEUTENANT E. A. CAMPBELL, R.A.

THE well-known Russian traveller Grum Grijmailo has described, in a masterly manner, in the November number of the "Historical Magazine," the typical characteristics of that part of the Chinese Army, the men of which are called "*Yoons*," or the bravest.

Amongst his remarks are the following:—Chinese soldiers march anyhow. Their armament is, in the highest degree, varied; one has a rifle, a second a sword; a third, both rifle and sword; a fourth, a spear; in fact, so diverse is their armament that it is impossible to describe the numerous variations. The non-commissioned officers possess revolvers and swords, but the officers are entirely unarmed. At first sight this seems remarkable, but one speedily becomes accustomed to this characteristic peculiarity of the Chinese Army; the more so when one suddenly recollects that the greater number of Chinese officers receive no special training in the knowledge of their duties, and that scarcely a tenth part of them even know how to shoot. . . . This latter is still more remarkable, but is, nevertheless, a fact.

Shooting with the bow, on horseback and on foot, fencing, and skill in carrying and hurling weights—such is the syllabus of the present imperial examination for the highest grades, that is for Doctors of Military Science. As regards the lower grades, they are recruited from the servants of the Commanders of Army Corps, from grooms, and from men condemned to military service by the civil mandarins, and are still less adapted for their position than are the higher grades. Furthermore, persons rarely attain the higher military offices, who, although not educated, in the Chinese sense of the word, yet nevertheless, having long served in the ranks, and therefore having become acquainted with a soldier's life, are well acquainted with the merits and defects of those parts of the army amongst which the greater part of their life has been passed. Various utterly senseless acrobatic feats (for instance, they turn somersaults, in order to deceive the enemy by a pretended wound, and simultaneously enable them to touch him with their long lance or, still better, compel the feeble infantry to attack, and deal blows with their exceptionally heavy and long spears), roaring to frighten the enemy, certain strange dances at stated intervals in which unaimed fire is carried on, solely to create noise; in fact, even in the present day, the chief importance is attached to bows, pikes and halberds. Such are the chief elements of instruction of the army. The parades are characterised by the quantity of ornamental arms and frequent genuflexions. An immense number of glittering banners, the moans of the rebecks, the yells of

the soldiers, their whimsical grimaces, or, on the other hand, their stealthy crawling towards an imaginary enemy, all this throws into ecstacies of delight the appointed military inspectors and Corps Commanders, who naively imagine that the whole range of military science is included in such childish folly. Besides, even such instruction as this is only given to the old militia. The *Yoons* receive no instruction at all. It is sufficient to glance at their rifles to be convinced how utterly helpless such troops would be against a well-armed European adversary. The soldiers have no knowledge of cleaning and examining their rifles, and certainly carry out no instructions for their preservation. It is enough to say that the soldier does as he pleases with his breech-loading rifle; he shortens it by cutting off a piece from the breech or muzzle, uses it as a handspike, or by tying two rifles together forms a litter. The rifles of the *Yoons* are covered with rust; frequently the back and fore-sights are broken off, for the western Chinaman does not understand their use, and finally the barrels are bent, and in places indented. The *Yoons* despise the breech-loading rifles, they do not know how to handle them and look upon the new importation with suspicion: "We knew how to shoot from the old rifles, but are afraid to from these," they frequently complain, and we must admit that their complaints are not unfounded.

The *armes blanches* of the *Yoons* are perhaps worse than those of any wild Negro tribe in the interior of Africa.

If to all that has been said we add that the soldier continually exists in a half-famished state, the chronic diseases from which the greater number of men in each company suffer, and the moral enervation due to idleness and opium, it is not difficult to understand what a pitiable spectacle is presented by a detachment of such warriors.

PRÉCIS
AND
TRANSLATION.

"RUSSIAN ARTILLERY JOURNAL."

THE MILITARY TRAINING OF FIELD ARTILLERY.

PRÉCIS BY

MAJOR E. A. LAMBART, R.A.

(Continued from No. 7, Vol. XXI).

THE author, in the present section of his article, treats of the new artillery unit, which, as it has as yet received no official designation, he elects to call a "group." For the sake of convenience I have substituted throughout, the no less unsatisfactory, but more familiar term, "brigade-division."—*E.A.L.*

The Brigade-Division.

By brigade-division is understood, in this article, a body of two or three 8-gun batteries, or three 6-gun batteries.

Each of these has its advantages and disadvantages, considered as the tactical unit of field artillery.

Such a unit, considered in the light of present tactics, must fulfil the following conditions:—

(i.) *Fighting Independence, i.e.*, such power of fire as to enable it to hold a given position independently, against frontal attack, in offensive or defensive action.

(ii.) *Suitability for command by one man*, both in manœuvring and action.

(iii.) *Divisibility* into not less than three fighting units.

This last condition is required to meet the necessity for the power to concentrate or distribute the fire of the tactical unit. Decisive effect from the fire of an artillery unit acting independently, can only be obtained by the concentration of an overwhelming number of guns on different points of the enemy's line. But the fire of all the guns of the unit cannot be employed for this purpose, on account of the danger of leaving a portion of the enemy's line unfired at. The unit must, therefore, be so composed as to allow of *concentration* combined with a certain degree of *distribution* at the same time. A proportion of two guns to one, is the

lowest from which a decisive effect can be expected in concentration, and a proportion of one to two is the lowest which is permissible in distribution, even allowing for the use of "rapid fire" by the latter.

As a principle in the fire-tactics of a unit, it may be accepted that, supposing it is not hampered by any special conditions in carrying out the task entrusted to it, its fire should be first of all devoted to silencing the *easiest target* in the enemy's line, so as to reduce as speedily as possible the total fire opposed to it. Such a target would naturally be the most exposed and nearest portion of the enemy's line. Such tactics are the more advisable that the easiest target in the enemy's line is also the most dangerous portion of it to us, since the very conditions which make it an easy target to us, make our batteries an easy target to it in return.

Three units in a brigade-division are particularly favourable to the execution of its fire-tactics, and to the "switching" of its fire from one target to another. Thus, when the fire of the former target is not yet quite silenced, two batteries can continue their fire against it, whilst the third battery is finding the range to the next target.

As regards "fighting independence," we may place differently constituted brigade-divisions in the following order of merit:

1. Four 8-gun batteries.
2. Three 8 ,, ,,
3. Three 6 ,, ,,
4. Two 8 ,, ,,

But as regards suitability for single command, the order should be reversed.

Again, as regards the divisibility required to meet the tactical conduct of fire, the four-battery brigade-division is the most suitable, next the three-battery, and in a two-battery brigade-division, it can only be arrived at by working one of the batteries as two independent half-batteries, an arrangement undesirable in many ways.

A brigade-division, even of four 6-gun batteries, loses much flexibility and mobility in manœuvre. More than four batteries are out of the question in a single command, and the same remark applies to four 8-gun batteries. They cannot be led or commanded by one man. From the above we conclude that a brigade-division of three batteries best fulfils the conditions of an artillery tactical unit, and three 8-gun batteries are better than three 6-gun batteries for the purpose.

Principles of Manœuvre.

Batteries of a brigade-division are numbered from the right in line; and in line, line of columns, and in action, are also designated right-flank, centre, and left-flank batteries.

In the normal order of march, batteries are in column of sub-divisions, the first line wagons in rear of sections, and the remaining echelons of wagons in rear of their respective batteries.

The advance to the preparatory position is made in the same order, except that the rear echelons of wagons are collected in rear of the brigade-division, under the command of the senior officer with the wagons, and the first line wagons drop in rear of their batteries.

The Brigade-division Commander has at his disposal an adjutant, a sergeant-trumpeter, and three orderlies, one from each battery, who follow him at six paces in single rank.

In manœuvring, the Brigade-division Commander leads the brigade-division; in line, the Battery Commander of the centre battery keeps the direction by him, unless he elects to lead a flank battery. In changes of formation, the Brigade-division Commander leads the leading battery in column, and in deployments, the

base battery. He can, if he wishes, hand over the leading to a Battery Commander, but the latter, in this case, does not quit his position at the head of his battery. Battery Commanders are the guides of their own batteries, which are moved by them quite independently at the pace ordered. Swords are always drawn at manœuvres by the Brigade-division Commander and the Battery Commanders. The brigade-division is parked at ten yards interval between guns and batteries. At manœuvre, Battery Commanders repeat the words of command of the Brigade-division Commander, but give the executive words of command at the proper moment. They all give signals (as laid down) with the sword, at the same time that they give words of command.

If the evolution entails the same amount of movement from all the batteries, they move at the same pace, and are halted by word of command of Brigade-division Commander.

In other movements the pace is maintained by the directing battery, and increased or reduced by the others, till the formation is completed. Great latitude is allowed, both in battery, and section and sub-division intervals, in action, in line and all lines of columns, and they need not be the same throughout the brigade-division. In changing formation the same intervals are retained in the new formation, unless other intervals are specially ordered.

Rapidity, flexibility, and simplicity in manœuvre, are only to be arrived at by wide development of initiative on the part of Battery Commanders. They must be able to grasp, and adopt at once, the formation best suited to the movement, so as to lead their batteries, by the shortest way, to their places in the new formation.

Reduced intervals should be largely made use of, as they render command easier, and are best suited to the avoidance of obstacles, &c.

Changes of front and direction of a full right-angle are sometimes unavoidable, but are exceptional, and on service, inclinations to the former front would be the rule. The Brigade-division Commander may change the direction of the leading body during the execution of a change of formation. It should be the practice for the Brigade-division Commander and the Battery Commanders to hand over frequently, their several commands, at manœuvre, to the next senior officers, that these latter may be practised in handling the brigade-division and batteries.

The brigade-division may be in the following "orders of formation," viz. :—

The order of advance,
" " " retirement,
" " " flank formation,
" " " oblique "
" " " action.

Lines and columns are designated lines and columns by the right or left, according to whether the first or third battery is on the right, or leading.

Distance in quarter-column is seven yards between batteries.

When manœuvring, the Brigade-division Commander is forty yards in front of the lead horses in all formations, except when retiring in action, when he is forty yards in rear of the centre of the line, or rear of the column. In retiring, the direction is kept by the Centre Section Commander of the centre battery ; or by the Section Commander of the leading section.

Battery Commanders are twenty-five yards in front of their batteries, the same distance in rear in retiring, and on the flank in column.

On the march, the normal formation is column of sub-divisions, but the front should always be increased if possible. If there is only room for a front of two carriages, the two leading batteries form a double column of sub-divisions (with a view to more rapid deployment), and the rear battery forms sections. The wagons conform.

The following formations are employed for the brigade-division :—

Line of sub-division columns from either flank.
,, ,, section ,, ,, ,, ,,
Column of sections from either flank.
,, ,, sub-divisions ,, ,,
,, ,, batteries.

The term "mass," borrowed from the French, is used to designate a line of column of sections, in which the guns are at full intervals of 13 metres, and the intervals between batteries is 26 metres. "Half-mass" is employed for line of sub-division columns, with similar intervals between batteries.

The following movements are laid down in detail :—

1. *Direct advance in line* (the first line wagons follow their batteries in sub-division columns).
2. *Increase or decrease of intervals* (may be of the whole line, or only parts of it).
3. *Change of direction of a line.*
4. *Advance in line of sub-divisions or section columns.*
5. *Increase or decrease of intervals in line of sub-division or section columns.*
6. *Formation of mass or half-mass.*
7. *Formation from line.*
8. *Formation of mass from half-mass, and vice-versâ.*
9. *Change of direction of line of sub-division or section columns, and mass or half-mass.*
10. *Deployments from line of columns, &c.* (These permit of further change of direction of leading body during the movement, the remainder moving to their places in line by the shortest way).
11. *Formation of sub-division column* (of the brigade-division) *from line, line of columns, mass and half-mass.*
12. *Formation of line to the front or flank, from column of sub-divisions.*
13. *Formation of line from column of sections.*
14. *Formation of line of section columns and mass from column of sections.*
15. *Formation of column of batteries.*
16. *Forming line and changing direction from column of batteries.*
17. *Echelon of batteries* (this is always from a flank and to the front, and may be formed either from line, or in the course of forming line from any columns).[1]

Reconnaissance of the Position.

If the brigade-division is detached, the Commander carries out a general reconnaissance in company with the Officer Commanding the force, handing over his command to the next senior officer. When the fighting and preparatory positions have been selected, he then sends for the Battery Commanders, and at the same time sends orders for the brigade-division to advance to the preparatory position, by an officer whose duty it is to find out a way for the advance of the batteries. This the officer communicates to the senior Battery Commander, who before pro-

[1] In none of these movements is any mention made of markers, who seem to be entirely dispensed with.
Line of sub-division columns appears to be more used than line of section columns.

ceeding to join the Commander, gives corresponding orders to the senior officers, who temporarily replace the Battery Commanders. The officer who has reconnoitred the road to the front accompanies the batteries in their advance as a guide.

Meanwhile the Commander continues to reconnoitre the position and the enemy (keeping as much under cover as possible), so as to have all possible information ready for the Battery Commanders when they join him.

Advance to the Preparatory Position.

This is made in "fighting order." The wagon echelons, collected under the senior officer with the wagons, detach themselves from the batteries, either during this advance or, if cover is available, during the advance into action. The Commander either meets the batteries here, or sends an officer with written orders to the batteries as to the direction of the advance into action, and the formation, accompanied, if possible, by a sketch.

Advance into Action.

This is made in line on good ground, or in line of sub-division columns if the ground is broken. In the latter case, the batteries must so time their movements as to allow of their all arriving on the position at the same moment.

The first line wagons follow in line of sub-division columns, deploying into line as they come up into position.

As a general rule the advance into action must be made independently by batteries. Only in exceptional cases can they be brought up and unlimbered by word of command from the Commander.

Continuous Advance into Action.

The above method of bringing the brigade-division applies only to those cases in which circumstances allow of ample time being devoted to careful reconnaissance of the position. It will, however, very often be necessary for the batteries to advance straight into action, and the only time available for reconnaissance will be the few moments which the Commander and Battery Commanders can gain on the batteries by the extra speed of their horses. It is therefore most necessary that these officers should cultivate the habit of quickly grasping the features of any position.

Intervals in Action.

These are very important. The greater the battery intervals the easier it will be to place the limbers and teams in favourable positions when they will suffer less from the enemy's fire. The best position for them is on the flanks of their batteries in line.

Ammunition Supply.

In this connection, the command of the wagon echelons is of great importance, and it should therefore be entrusted to an officer of experience. He should allow considerable latitude to the Commanders of wagon echelons under him, in the choice of their positions. The wagons must always be sufficiently apart to allow of the teams to move about.

The officer in command of the echelons must at once establish communication with the Commander, and the Echelon Commanders under him with their Battery Commanders. If one battery runs short of ammunition before the others, the Echelon Commander should communicate with the Commander, and ask his permission to replenish it from the echelons of the other two batteries. He has no power to draw on the wagons of another brigade-division without orders from his own Commander or the Commander of the artillery.

Brigade Drill of Several Brigade-divisions.

When several brigade-divisions are collected under a General of artillery each Brigade-division Commander will establish connection with him by an orderly officer.

The movements and formations are those laid down for a single brigade-division :

In columns the distance between brigade-divisions is always sixty yards.

At brigade drill, the advance, halt, wheel about, and wheels right and left are made by bugle sounds, or signals from the General Officer Commanding. Calls are repeated only by trumpeters of Brigade-division Commanders.

All other movements are made on orders sent by orderly officers, who communicate the movement, pace, and direction, to the Brigade-division Commanders. All the brigade-divisions move by signal or bugle-call from the General Commanding.

(*To be continued.*)

NOTES

FROM

CORRESPONDING MEMBERS.

The following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

Major-General Stubbs's "List of Officers of the Bengal Artillery," price 5s. 3d.

"Field Artillery Fire," by Captain W. L. White, R.A., price 1s. 2d.

"Notes of Lectures on Artillery in Coast Defence," by Major A. C. Hansard, R.A., price 1s. 2d.

"Ranging Note-Book," by Captain S. W. Lane, R.A., price 1s. 1d.

"Achievements of Field Artillery," by Major E. S. May, R.A., bound, price 2s. 6d.

"The Value of Mobility for Field Artillery," by Major E. S. May, R.A., paper covers, price 3d.

"The Young Officer's 'Don't,' or Hints to Youngsters on Joining," by an Officer R.A., price 7d.

The two Numbers of "Nature" containing Professor C. V. Boys's Lecture on "Photography of Flying Bullets," fully illustrated, price 8d.

Examination questions in (*c*), (*d*), and (*e*) set in the four examinations ending May 1893:—

Captains (*c*) and (*d*) ... price 1s. 1d.
Lieutenants (*c*) (*d*) and (*e*) price 1s. 1d.

Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

A new and very carefully revised edition of Lieut.-Col. J. C. Dalton's "Hints to Officers taking over Drafts for India" is now ready, and will be sent free to any Officer asking for a copy; it will be found invaluable to nearly everyone going to India.

As a revision of Kane's List, based on the notes and work of General Askwith, R.A., is now in hand, the Committee would be very glad of assistance in the way of notes or records which may be in the possession of, or have been kept by, Officers of the Regiment.

Any MS. books or notes which may be lent to the Committee will be carefully treated and returned the instant they are done with.

So many of the older Officers of the Regiment were in the habit of keeping their copies of Regimental Lists, or histories up to date, that it is quite possible that much valuable information with regard to former Officers of the Regiment, as well as other items of Regimental history, which are still hidden away, may be brought to light in this manner.

The Officer Commanding R.A. Sierra Leone, would very thankfully receive any gifts of worn novels for the use of the Permanent (European) Detachment, R.A., at Sierra Leone. As the N.-C.O's and men of this Detachment are relieved yearly, it is impossible to maintain a fund sufficient to buy books. All such books may be sent to the Secretary, R.A. Institution, Woolwich.

A LETTER

FROM

LI HUNG CHANG

TO

LIEUT.-COL. C. G. GORDON (LATE MAJOR.-GEN. C. G. GORDON, C.B., R.E.).

THE following portion of a letter is reproduced from the Notes of R.A.I. "Proceedings," No. 8, Vol. XIV., March 1886. It was communicated by Lieut.-Col. H. W. L. Hime, then Secretary R.A.I., and is of peculiar interest now that the questions of Li Hung Chang and the yellow jacket are subjects of general interest.

To

LIEUT.-COLONEL GORDON,

Late Commander-in-Chief of the Ever Victorious Army.

WHEN Colonel Doyle was going home, I enjoined him to enquire as to your welfare, and from your letter lately received, I am fully impressed with the sincerity of your esteem for me, and have to thank you for the interest (undiminished by time and distance) which you continue to take in my doings. I understand that yon are at present engaged in erecting batteries, and I have no doubt but that by skill now displayed, you will add to your reputation.

. . . . . .

That peace may long continue I fervently join with you in wishing, but if an appeal to arms should at any time become necessary, I shall, while taking the precautions enjoined by you in your note, still be inclined to look to you for aid. The flags of the Ever Victorious Army are still in my possession. From time to time I have them unfurled for inspection, and whilst they serve to remind me of old times and doings, they also cause my thoughts to wander to you who are so far away. You enquire about the yellow jacket: the decoration was first instituted during the present dynasty for award to Princes, Statesmen, famous Generals, the original recipients being those who fought "The Three Insurgents," and reduced once more to allegiance the districts of "Tsunghae," "Ya Kinchawam," "Teasn Kin Chwan," "Chun foo," "Hwangpoo," and "Sin Kiang." Since the days of "Heew fung," those to whom the jacket has been awarded are few in number, whilst of those from western lands, who have assisted China in military matters, you alone, by your loyal and valuable service, have been the recipient of this mark of gracious favour. The fact will doubtless be handed down to future generations, and I pride myself with the thought that you will continue to rise to high positions of honour and distinction. I have requested Mr. Hobson to translate and forward this reply, and, wishing you the compliments of the season, I enclose my card, and am,

&c., &c., &c.,

LI HUNG CHANG.

HALIFAX, N.S.

THE summer has passed very pleasantly with the usual amusements of fishing, yachting, polo, cricket, lawn tennis, rowing, and quoits.

Captain Lushington went fishing on the Miramichi River, and killed two salmon and a number of grilse.

A further zest has been added to yachting by the R.E. and King's Regiment having each purchased a Tancook whaler, similar to the R.A. whaler, "Valkyrie," and weekly races between these three craft have been keenly contested all through the season.

A garrison "four" was entered for the Bankers' Regatta, in which Lieuts. Cayley and Castens rowed, but, unfortunately, they never got further than the starting post, owing to the former's oar breaking at the first stroke. The gig race was, however, won in splendid style by the five-oared gig of No. 3 Company, Western Division.

The two garrison lawn tennis courts have been open all the summer. The mixed double tournament, on the 13th July, was won by Major Alexander and a young lady, with a score of 56 out of a possible 90.

At the Studley Quoit Club the "Noyes Cup" has now been supplemented by the "Isaacson Spoon"—a handsome silver mounted mahogany spoon—to go to the member who makes the *highest* score in the Annual Championship Competition. This will take the place of the old kitchen wooden spoon, which used to be presented on this occasion with speeches and much merriment. Those who are acquainted with the system of marking at quoits, will be aware that the man who makes the highest score does not win the prize.

The mess premises in the R.A. Park have been closed for 3½ months for alterations, which are a great improvement. What was known as the "Christopher Chamber," has now been taken into the mess-room, and the size of the latter consequently increased, so that all the members of the mess (including married officers), with a good number of guests, can sit down together at one long table, without the necessity of having a side table. The ante-room has been extended west, as far as Queen Street, which is overlooked by a bow-window in the S.W. corner of the room. A new wine cellar has been excavated under the billiard-room. The officers' quarters have been joined to the mess by the intervening space being built over, and the extra accommodation thus afforded will be utilized as a dressing-room and mess office. Owing to this extension, the road from the Birmingham Street gate is blocked, and there is now no longer any traffic through the R.A. Park. During the time the mess was closed for these alterations a temporary mess was opened in Judge Townshend's house, 162, Pleasant Street, which Government hired furnished for the purpose, and a breakfast mess was opened by kind permission of Colonel Isaacson, in his quarters.

Lord and Lady Aberdeen, family, and staff, spent the month of August at Maplewood, on the N.W. Arm. Their Excellencies presence at Halifax did not make much difference to the garrison, except for a few salutes, guards of honour, State dinner parties, garden parties, and a *levée*.

The G.O.C. Troops in Canada, General Montgomery Moore, has made a very welcome innovation by throwing the Citadel open to visitors during the summer, between certain hours. This privilege has been taken the fullest advantage of by the Americans, who swarm to Halifax when the weather in the States becomes inconveniently hot. Visitors have to register their names in a book in the Guard-room, and are then supplied with a guide in the shape of a gunner. Long strings of them are to be seen going round the ramparts all day long. Between 24th July and 24th August, the Citadel was visited by 3004 persons, about 75 per cent. of whom were Americans.

On the 10th September, a big farewell dinner of 30 covers was given to Major Boileau, in the temporary R.A. and R.E. Mess, at 162, Pleasant Street, on the occasion of his leaving Halifax, on promotion, after having been stationed there for seven years (less one month), during which time he was for five years Adjutant of the R.A., in British North America. Colonel Isaacson, R.A., presided at the

dinner, and in a few kind words proposed Major Boileau's health, which was drunk and accompanied by the usual salute of one gun, fired by the junior R.A. subaltern present, Second Lieutenant Dwyer.

On 19th September a shocking accident occurred, resulting in the death of Major J. C. M. de la Poer Beresford, R.E. The deceased officer was walking in the roof garden of the Halifax Hotel, when he lost his balance and fell over into Water Street, a height of 50 feet. Death was instantaneous. Much sympathy was felt for Mrs. Beresford and his son, who were living in the Hotel at the time. Major Beresford was buried with full Military honours in Fort Massey Cemetery on 21st September. The funeral was attended by the whole Garrison, a detachment of the Royal Navy, the Canadian Militia, and a number of representative civilians, and was witnessed by thousands of spectators.

These notes are the last from Halifax that will be furnished by Major Boileau, R.A. Since the first institution of Corresponding Members he has regularly supplied a batch of interesting and amusing Regimental information, and the Committee would be much pleased if other Corresponding Members would follow his example.

OBITUARY.

The death, at a comparatively early age, of Major Coffey, will be read of by all who knew him with much regret, and as the commencement of his military career was somewhat remarkable, I do not think we should allow it to remain unrecorded. I only wish that it had fallen to some one better able than I am to give a fuller and more accurate account of what happened.

Charles Edward Coffey, who was born in Dublin, 5th May, 1851, came of an Irish family, his father being a Queen's Counsel, and joined the R.M. Academy on 2nd February, 1869. When approaching the end of his course at that institution, the all-absorbing topic of interest was the Franco-German War of 1870-71, and Coffey, suddenly fired by enthusiasm and imbued with a spirit of restlessness and recklessness, made up his mind to risk throwing up the career which he was so soon to have entered on and to depart for the seat of war with a view to getting employment in the French army. He accordingly raised sufficient ready money on some of his property, bought a regulation sword, and thus equipped he left the R.M.A. in November, 1870, and made his way to France, having taken "french leave" of the authorities. He was struck off the books of the R.M. Academy, at the request of his father, on 31st December, 1870. His journey through France to Bordeaux, where Gambetta was carrying on the government of the country, was by no means an easy one, as he had to run the gauntlet or turn the flank of the German armies, but he eventually reached Bordeaux safely in the winter of 1870, and obtained an audience of M. Gambetta by means of a letter of introduction which he had to a French officer. Coffey petitioned that he might be employed in the French army, and preferably in the Artillery, and on being asked what qualifications he had, he stated that he was a student of the English Artillery School at Woolwich. In telling me the story about two years afterwards, Coffey said he imagined that the French authorities must have believed him to be an officer of Artillery, who had been going through a course of gunnery, for they at once acceded to his request, and attached him as a volunteer to a Field Battery, having rigged him out with a *kepi* and a very limited kit. He found himself in the thick of it within a very short while; the battery he was attached to formed part of the Army of the Loire, under General Chanzy, and with it Coffey took part in the battle of Le Mans and in other minor actions until the conclusion of the

war, when he had attained to the rank of an Acting Lieutenant and was A.D.C. to the officer commanding the Artillery of the 21st *Corps d'Armée*; he had also been recommended for further promotion. I remember his telling me of an incident which occurred on one occasion when the axletree-arm of one of his guns was shot away, and it was entirely due to his prompt action that the gun was saved and was able to retire with the battery which was being hard pressed by the Germans. Coffey, who had been studying the R.A. drill books at the Academy, and having been instructed how to act when the axletree was disabled, was able to apply the proper aids, and by means of spare poles, dragshoes and lashings to rapidly extemporize the means whereby the gun could be made to travel. He told me that his worst *quart d'heure* was on one occasion when his battery was pursued in a road by German Cuirassiers, and the prospect of cold steel seemed to him far more redoubtable than the heavy rifle and artillery fire to which he had become comparatively callous. At the last he found himself with the army in a position, where they had the sea on one side and the Germans on the other, and he escaped a disagreeable *dénouement* by the armistice being agreed on. He was then allowed to return to England, and the military authorities at home, at the request of his father, reinstated him at the R.M. Academy, on the 1st May, 1871, where he remained until 20th February, 1872, when he passed for his commission in the Royal Artillery, which commission was antedated to 15th December, 1871. Coffey was favourably reported on by Colonel (now General) the Hon. W. H. A. Feilding, the British military attaché at the French Head-Quarters, who mentioned in his report that Coffey had received a temporary commission as Sub-Lieutenant in the French Artillery, and he added "and from all sides I hear he gives satisfaction." I have also seen a complimentary letter from General Chanzy to Coffey, in which the General expressed a wish that he might confer the "*Légion d'Honneur*" on him; this, however, the rules of this country at that time debarred him from accepting. Coffey was very modest and reticent with regard to his experiences, and unless specially invited or drawn out he rarely discussed them. It is some 22 years since he told me, when we were both quartered at Devonport, what I have endeavoured to recall to mind now, and he told me a good deal more which I am unable after this lapse of time to bring to mind so as to relate with sufficient accuracy. There are probably others of Coffey's friends who may know more details of an interesting nature. I, however, thought it would be a pity not to put on record what little I did know, and venture to think it adds one more curious page to the very long chapter of adventures of officers of the Royal Artillery.

On the occasion of a visit of the Empress Eugénie to Malta in 1877 or 1878, the officers of the R.A., who had been at the R.M. Academy with the late Prince Imperial, were fallen out on a review parade and introduced to the Empress. Coffey, who was serving at Malta and was present on this occasion, was fallen out at the same time, and the Empress spoke some kind words to him on the subject of his experiences as a French officer during the war.

Major Coffey retired on 16th December, 1893, and died at Yoxford, Kent, on 20th September, 1894.

J.C.D.

Lieutenant R. Roper, who died at Trevandrum, India, on 28th September, 1894, was commissioned as 2nd Lieutenant, 14th February, 1890, and became Lieutenant, 14th February, 1893.

Lieutenant F. Burge, who was killed by accident whilst playing polo at Jullundur, on 1st October, 1894, joined the Regiment as 2nd Lieutenant, 14th February, 1890, and became Lieutenant, 14th February, 1893.

General Sir D. E. Wood, G.C.B., Colonel-Commandant, R.H.A., whose death occurred at Park Lodge, Sunningdale, on 16th October, 1894, joined the Regiment as 2nd Lieutenant, 18th December, 1829; became Lieutenant, 20th June, 1831; 2nd Captain, 23rd November, 1841; Captain, 9th November, 1846; Brevet-Major, 20th June, 1854; Lieutenant-Colonel, 20th June, 1854; Colonel, 2nd November, 1855; Major-General, 6th July, 1867; Colonel-Commandant, 8th June, 1876; Lieutenant-General, 26th November, 1876; and General, 1st October, 1877. Sir David Wood served in the Kaffir War of 1842-3, and commanded the Royal Artillery on the Eastern frontier of the Cape of Good Hope (medal). The Crimean Campaign, 1854-5; commanded the Royal Artillery, of the 4th Division, at the battles of Balaklava and Inkerman, at the repulse of the sortie on 26th October, 1854, and at the siege and fall of Sevastopol. (Mentioned in Despatches, *London Gazette*, 2nd December, 1854; medal with three clasps, Brevet of Colonel, C.B., Officer of Legion of Honour, 4th Class of Medjidie, Turkish Medal). Indian Mutiny, 1857-9.—Action at Pandora, commanded the R.H.A. when they acted as Cavalry, and charged and defeated a large force of rebel Sepoys, Siege of Lucknow and final capture of the town, and subsequently commanded the Station and Fort of Allahabad. (Mentioned in Despatches, *London Gazette*, 3rd March, 25th May, and 17th September, 1858. Medal with clasp, K.C.B).

NOTES

FROM

CORRESPONDING MEMBERS.

THE following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below:—

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Tables of Four-Figure Logarithms, pocket edition, mounted on linen, price 3d.

Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

A CORRESPONDENT writes:—It may interest some readers of the "Proceedings" of the R.A.I., apropos of the remark upon the "Townshend" cannon, at page 454, Vol. XXI., No. 9, to know that there is one of these guns mounted as an ornament in the grounds of the Governor of Barbados' official residence, in the West Indies. It bears the Townshend arms and the Latin motto:

"*Hæc generi incrementa fides.*"

I have asked classical scholars to translate the inscription, which none of them could do. I afterwards found it to be intended to mean: "Fidelity obtained these honours for our race." But, the verb being implied only, and not actually present, it appears to me that the motto might be read otherwise.

HALIFAX, N.S.

THE Garrison Cricket Club has been revived this year, chiefly owing to the zeal and enterprise of the new President of the Club—Lieut.-Colonel Anstruther—in securing a ground early in the season. It is situated on the Jubilee road, and is

known as the Crescents' ground. There has practically been no cricket amongst the garrison for two years—since the expiration of the lease of the old ground on the Quinpool road. Colonel Anstruther is captain of the garrison eleven, and has been batting and bowling in his old form; he made 23 against Truro; 27 against the Wanderers in one match, 28 in another; and 86 against the Lowell eleven, including 5 sixes. The other officers of the Regiment who have played for the garrison are Lieut. Cayley, 2nd Lieut. Mackenzie, and Lieut. Everett (I.O.M.). The matches which have been played so far are: Crescents (won), Windsor (won), North-West Arm (lost), Truro (won), Wanderers, two days, (lost), one day (won); St. John, N.B. (lost); Lowell, Mass., U.S.A. (won). 2nd Lieut. Mackenzie put up 21 runs in the Truro match. On 5th July a friendly match was played between the R.A. and R.E., which the former won by nine wickets. Lieut. Everett played two good innings of 13 and 53 for the R.A., and Lieut. Scholfield made the score of 23 for the R.E., and also bowled with effect.

Owing to the late summer this year the first practice at cricket did not take place until the 30th May, and the first match was played on 2nd June.

In the middle of June Lieut. Cayley joined the station to take up the appointment of Gunnery Instructor *vice* Capt. Lowe, and about the same time 2nd Lieuts. Castens, Saunders and Dwyer joined their companies on first appointment from the Royal Military Academy.

Major Alexander, R.A., has been elected secretary of the Polo Club, which is "booming" this season more than it ever has since the days of "Jack" Mansell, of the Rifle Brigade. There are more than twelve regular playing members, and there is a game every Tuesday and Friday, with tea for the ladies and occasionally a band. On 10th July a match was played between the R.A. and the 8th King's Regiment, sides as follow:—

R.A.	King's.
1 Captain Lushington,	1 Captain Johnson,
2 Major Alexander,	2 ,, Campbell,
3 2nd Lieut. Mackenzie,	3 Major Banning,
Back Captain Duffus.	Back ,, Mellor.

The R.A. won by five goals to one; for the R.A., Major Alexander hit four and 2nd Lieut. Mackenzie one, while Captain Campbell obtained the goal for the King's Regiment.

On the 24th July another match was played as under:—

Field Officers.	The rest of the Garrison.
1 Major Alexander, R.A.,	1 Mr. Steavenson, King's,
2 ,, Brady, R.A.,	2 Mr. Mackenzie, R.A.,
3 Lieut.-Col. H. Clerke,	3 Mr. Scholfield, R.E.,
Back Major Mellor, King's.	Back Captain Campbell, King's.

Result: Won by the Field Officers by six goals to one, Major Alexander hitting the whole six and Captain Campbell the one.

OBITUARY.

Colonel C. A. Purvis, who died at Bath, on 7th September, joined the Madras Artillery as Second Lieutenant 11th June, 1839; became Lieutenant, 23rd November, 1841; Captain, 11th June, 1854; Lieut.-Colonel, 5th January, 1863; and retired on full pay, with the honorary rank of Colonel, 20th April, 1865. He was present at the taking of the Fort of Badamee in June, 1841; served in the Burmese war of 1852 (medal); commanded the Artillery at Martaban, and was present at the various attacks on that place by the Burmese.

RESULT OF MATCHES—1894.

Matches played, 15. Won, 6. Lost, 2. Drawn, 7.

Opponents.	Where Played.	When Played.	R.A.		Opponents.		Remarks.
			1st Innings.	2nd Innings.	1st Innings.	2nd Innings.	
Won.							
Aldershot Division ...	Aldershot	25 26 May	143	228	109	141	Won by 121 runs.
Household Brigade ...	Burtons C't	13 14 June	219	—	70	107	Won by 1 innings & 42 runs.
B.B.	Woolwich	22 23 June	256	—	110	108	Won by 1 innings & 38 runs.
R.M. Academy.....	Woolwich	16 17 July	101	96*	104	89	*4 wickets. Won by 6 wickets.
Free Foresters	Woolwich	27 28 July	160	61*	57	162	*1 wicket. Won by 9 wickets.
I.Z.....	Woolwich	8 9 Aug.	148	84	107	88	Won by 37 runs.
Lost.							
Mote Park.....	Mote Park	30 31 July	64	196	198	65*	*No wicket. Lost by 10 wickets.
Eton Ramblers	Woolwich	13 14 Aug.	128	181	318	—	Lost by 1 innings & 9 runs.
Drawn.							
Green Jackets	Winchester	1 2 June	407*	—	190	178†	*6 wickets; innings closed. †8 wickets.
Gentlemen of M.C.C.	Lords	18 19 June	284	—	294	58*	*2 wickets.
Yorkshire Gentlemen	Woolwich	27 28 June	225	212*	156	131†	*7 wickets; innings closed. †9 wickets.
Oxford Authentics ...	Woolwich	6 7 July	362	—	137	278*	*8 wickets.
Harlequins.....	Woolwich	9 10 July	177	55*	146	209	*1 wicket. Rain.
Royal Engineers	Chatham	13 14 July	122	23*	240†	—	*1 wicket. †9 wickets; innings closed. Rain.
Royal Engineers	Woolwich	3 4 Aug.	247	109*	185	53†	*6 wickets; innings closed. †3 wickets.

Batting Averages.

Names.	No. of Innings.	Runs.	Most in an Innings.	Times not out.	Average.
F. W. D. Quinton	4	172	122*	1	57·33
Captain P. H. M. Dorehill	11	319	55	2	35·44
C. C. Van-Straubenzee	23	548	117	3	27·4
R. A. Birley	5	137	83	—	27·4
Sergt.-Major Cochrane	8	150	45	2	25
C. H. de Rougemont	17	405	90	1	24·06
T. M. Usborne	7	142	67*	1	23·66
W. Strong	6	142	50	—	23·66
Captain H. R. Adair	14	282	59	1	21·69
Captain C. D. King	15	280	50	2	21·53
Major F. A. Curteis	19	403	88	—	21·21
Captain J. G. E. Wynne	5	94	51	—	18·8
C. Prescott-Decie	5	43	34*	2	14·33
Captain A. Handley	8	85	37	2	14·16
Major A. J. Abdy	5	55	39	1	13·75
A. E. J. Perkins	18	210	59	2	13·12
Bombr. Osmond	4	39	27	1	13
" Butler	17	72	29	5	6
Captain J. P. DuCane	5	27	10	—	5·4
Captain F. H. Crampton	10	36	19	—	3·6

And nineteen others who played fewer than four innings each.

* Signifies not out.

Bowling.

The following took wickets as shewn below:—

Lieut. C. C. Van Straubenzee	bowled in	7	innings	taking	16	wickets.
" A. E. J. Perkins	"	3	"	"	14	"
Bombr. Butler	"	20	"	"	70	"
Capt. P. H. M. Dorehill	"	5	"	"	9	"
Lieut. E. G. Waymouth	"	4	"	"	10	"
Capt. A. Handley	"	5	"	"	14	"
Lieut. C. Prescott-Decie	"	5	"	"	25	"
Capt. F. H. Crampton	"	7	"	"	15	"
" H. R. Adair	"	12	"	"	37	"

NOTES

FROM

CORRESPONDING MEMBERS.

GOLD MEDAL PRIZE ESSAY, 1895.

THE Subject approved by H.R.H. The Commander-in-Chief for the "Duncan" Gold Medal Prize Essay, 1895, is as follows :—

> "The most suitable system applicable for training together in peace time the Garrison Artillery forces of the Empire, including Regular, Militia, Volunteer, and Colonial Artillery, with a view to their duties in war time in Coast Fortresses being more clearly defined."

The Rules for the Prize Essays now read :—

The Annual Gold Medal, when awarded, to be accompanied by an *honorarium* of £20; the Silver Medal by an *honorarium* of £10.

The candidates must be Officers of the Regiment who are members of the R.A. Institution.

Officers are requested to confine their Essays to about 16 printed pages of the "Proceedings;" other things being equal brevity will count towards success.

The Essays must be forwarded to the Secretary so as to reach him on or before the 1st of April.

Each Essay must be *type-written* in triplicate. The Essays must be strictly anonymous, but each to have a motto, and be accompanied by a sealed envelope with the motto written outside and the name of the writer inside; further, if the writer wishes to recover from the Committee part of the cost of type-writing his Essay he should state this fact in the same sealed envelope and write outside it, above the motto, "to be opened."

All the envelopes thus marked will be opened by the Secretary after the result of the competition has been announced, and he will send the writers the money for their type-writing expenses.

The Committee will allow a sum of £1 for type-writing each Essay.

N.B.—The Committee draw particular attention to the paragraph in the Rules above on the subject of length of Essays; it is not difficult to discover the number of words in an average page of "Proceedings" matter, and so to keep an Essay within the 16 pages' limit.

THE following works are now on sale at the R.A. Institution and will be forwarded post free at the prices noted after their titles below :—

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Lithographic plates of Field Artillery Harness stripped and laid down for inspection, price for pair (lead and wheel), 1d.

A Correspondent writes:—

Readers of Captain Oliver's article on Madagascar in the *United Service Magazine* for November, will have noticed that the Hova Artillery is commanded by a Major Graves, late of the Royal Artillery. I do not think this officer is to be identified with any of the same name in Kane's list, but that his R.A. service was in the ranks of "D" (now "H" Battery) "A" Brigade, R.H.A., under the assumed name of Lowther.

I joined the Battery as junior subaltern in January 1877, just after it returned home from India. Lowther was then No. 2 of my No. 3 gun detachment, his friend Blake being the Sergeant of No. 4 Sub-division, they were both men of good birth and education, and had been clerks together in the Bank of Ireland. Lowther afterwards became acting-bombardier, but did not hold the stripe long, owing to the authorities getting wind of a boxing competition held in the riding-school one Sunday afternoon, in which Lowther represented the R.H.A., his opponent being the champion of the Hussar regiment then in Woolwich. Blake's family had some connection with the 17th Lancers, and this enabled him to get a transfer for himself and Lowther to that regiment just before it embarked for Natal, early in 1879, Blake resigning his sergeant's stripes; and two very smart Lancers they looked, in their new uniforms, when they came to say good-bye to their old battery.

Lowther remained in Natal when the regiment went on to India, and I next heard of him as an officer of the Cape Mounted Police, serving under his own name of Graves, and somewhere about ten years ago I heard that he had gone to Madagascar and obtained employment in the Hova army. There is little doubt that it is the former Gunner Lowther who, in command of the Hova Artillery, is destined to played a prominent part in the coming war.

GOLF.

ROYAL ARTILLERY *v.* ROYAL ENGINEERS.

The following conditions have been agreed upon by the Games' Fund Committees of the Royal Artillery and Royal Engineers, as those under which an Inter-regimental Golf match shall be played.

1. That one match be played annually.

2. That the "Green" on which the match is to be played should be settled by

mutual agreement from year to year. The first match to be played at either Sandwich or Littlestone, with preference to the former.

3. That the match be played, if possible, during the month of April (soon after the spring meeting of the club on whose "Green" it has been decided to play it).

4. That the number of players a-side be eight.

5. That all officers on full-pay or half-pay, awaiting employment, be eligible to play.

6. That single and foursome matches be played (18 holes each).

7. That before the match, lists of players on each side be prepared, giving the names of the players in order of merit, and that (*a*) for the single matches the players be paired against each other according to these lists (No. 1 R.A. playing No. 1 R.E. and so forth), and that (*b*) for the foursome matches, the pairs to play together, on either side, be taken in order of merit from the above-mentioned lists (Nos. 1 and 2 R.A. playing Nos. 1 and 2 R.E., and so forth).

8. That the side winning the greater number of holes (results of single and foursome matches being added together) wins the match.

9. That the match be played under the "local rules" and "bye-laws" of the club on whose "Green" it is played.

The Committee of the R.A. Games' Fund will shortly send out to every R.A. Mess at home, and to such individual officers as may ask to be supplied with a copy, a notice of the rules governing the selection of the R.A. side.

SHOEBURYNESS.

In compiling a catalogue of the Library in the Royal Artillery Mess, Shoeburyness, it has been found that many volumes are missing, and it is probable that most of these have been taken away accidentally. The Secretary will be very much obliged if any officers finding such volumes among their books will return them, addressed to

The Secretary,
Royal Artillery Library,
Shoeburyness.

WOOLWICH.

At Woolwich, on November 1st, the centenary of "E" Troop, R.H.A., was celebrated by "E" Battery, now stationed there.

All the officers, N.-C.O.'s. and men who were on leave returned for the day; and at 7 p.m. the whole battery, with a considerable number of N.-C.O.'s and men who had formerly served in it, with their wives and a few friends, sat down to dinner to the number of 280, in the garrison gymnasium, which had been lent for the occasion. It had been decorated with flags, and the names of the battles in which the troop had taken part; a stage had been put up at one end of the room, and in the gallery a portion of the regimental band, under Sergeant-Major Walker, played a selection of music during dinner.

At a quarter to eight the officers of the battery took their seats on the stage, accompanied by Generals Lynedoch Gardiner and King, Colonels Elton and England, Lieut.-Colonels Wallace and Blaksley, Major Balfour, and Captains

Brown and Biddulph, all of whom had served in the battery, and Colonel Pipon, in whose division the battery has now served for some years.

A short history of the troop had been printed and distributed to everyone present.

Major McDonnell, the present Commanding Officer, in proposing the toast of "E" Troop, explained that the object which he and the officers of the battery had in keeping this centenary, was to remind those now serving of the brilliant achievements of their predecessors, and to ensure that the history of the troop was not forgotten, as it might easily be in these days of rapid changes. He pointed out that at present there was not a single officer, N.-C.O. or man in the battery who returned with it from India, as lately as four years ago. The toast of "Long life and prosperity to "E" Troop," was drank with enthusiasm by all present.

General Lynedoch Gardiner, under whose father, Sir Robert Gardiner, the troop has obtained such renown in the Peninsular War, and who had himself commanded it from 1855 to 1858, briefly addressed the meeting; as did General King, a former commander from 1869 to 1875.

The past officers of the battery were entertained at dinner at the R.A. Mess by those now serving, and although it was the leave season Major-General Smart and a number of the officers of the Woolwich Garrison were present. The string band of the regiment, under Cav. Zavertal, played delightfully. In returning thanks for the past officers, General Lynedoch Gardiner made a most interesting speech, after referring to the services of his father, he spoke of those of his grandfather, Sir John MacLeod, by whom, while he filled the position of D.A.G. at the Horse Guards, the Royal Horse Artillery was invented and for the first time organized.

After dinner many of the officers returned to the gymnasium, where a smoking concert was going on. A musical farce, written by Lieut Adair, R.A., was capitally performed by its author and Miss Rose Swinerd; Captain du Cane, R.H.A., Q.M.S. Roberts, Miss Amy Francis and others, contributed songs and recitations, and a very enjoyable evening was spent.

R.M. ACADEMY CRICKET PAVILION.

The authorities of the R.M. Academy believe that many officers of the regiment will regret to hear that the response to the appeal for subscriptions towards a cricket pavilion at the R.M. Academy has been somewhat disappointing. Were everyone, who has been educated at that institution, to support with only a small contribution the object in view, it would very easily be attained. In these days of rigorous economy and many pressing needs, it is hopeless to look for help from Government sources; and, in fact, the Academy, so far from being aided officially, is hampered by certain conditions, which impose upon it the necessity of a structure, architecturally in keeping with the remainder of the building. It is hoped that many officers, who have perhaps overlooked the matter, when they have had their attention drawn to the circumstances, will feel disposed to lend some little assistance towards an undertaking in which all are interested, to whom cricket and old associations appeal.

OBITUARY.

Lieut.-Colonel J. P. Cundill (retired), whose death occurred on 28th October, 1894, was first commissioned as Lieutenant, 16th December, 1864; became Captain, 9th July, 1877; Major, 1st January, 1884; Lieut.-Colonel on half-pay, 1st

January, 1891; and retired on retired pay, 1st October, 1892. Lieut.-Colonel Cundill was an Assistant Instructor, Royal Laboratory, from 1st January, 1877, to 31st March, 1881; Captain-Instructor, Royal Laboratory, 1st April, 1881, to 30th December, 1881, and at the time of his death was a Government Inspector of Explosives.

Major-General R. Curtis (retired) died in London on 5th November, 1894; General Curtis joined the Regiment as Second Lieutenant, 1st October, 1847 · became Lieutenant, 30th June, 1848; Captain, 13th December, 1854; Major, 6th June, 1856; Lieut.-Colonel, 1st January, 1868; Colonel, 1st October, 1876; and retired with the honorary rank of Major-General on full-pay, 19th January, 1881. He served in the Crimean campaign, and was present at the siege and fall of Sebastopol (medal with clasp, Turkish medal and brevet of Major), was Brigade-Major, School of Gunnery, from 1st April, 1864, to 1st May, 1869, and Chief Instructor, School of Gunnery, from 23rd June, 1875, to 30th April, 1880.

Lieutenant T. L. L. Boulton died at Ventnor, Isle of Wight, on 6th November, 1894. He joined the Regiment as Lieutenant on 24th July, 1886, and at the time of his death was Adjutant of the 2nd West Riding of Yorkshire Artillery Volunteers.

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